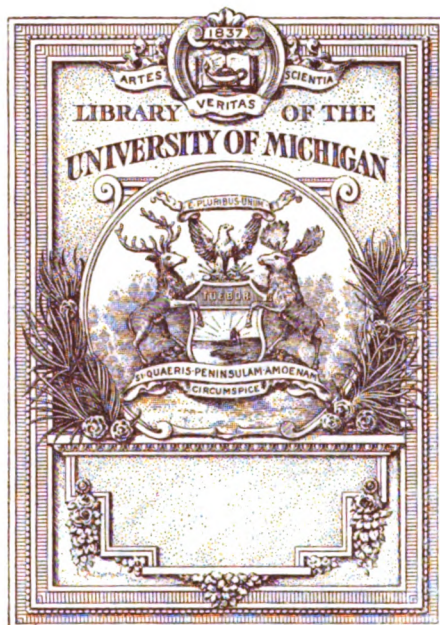


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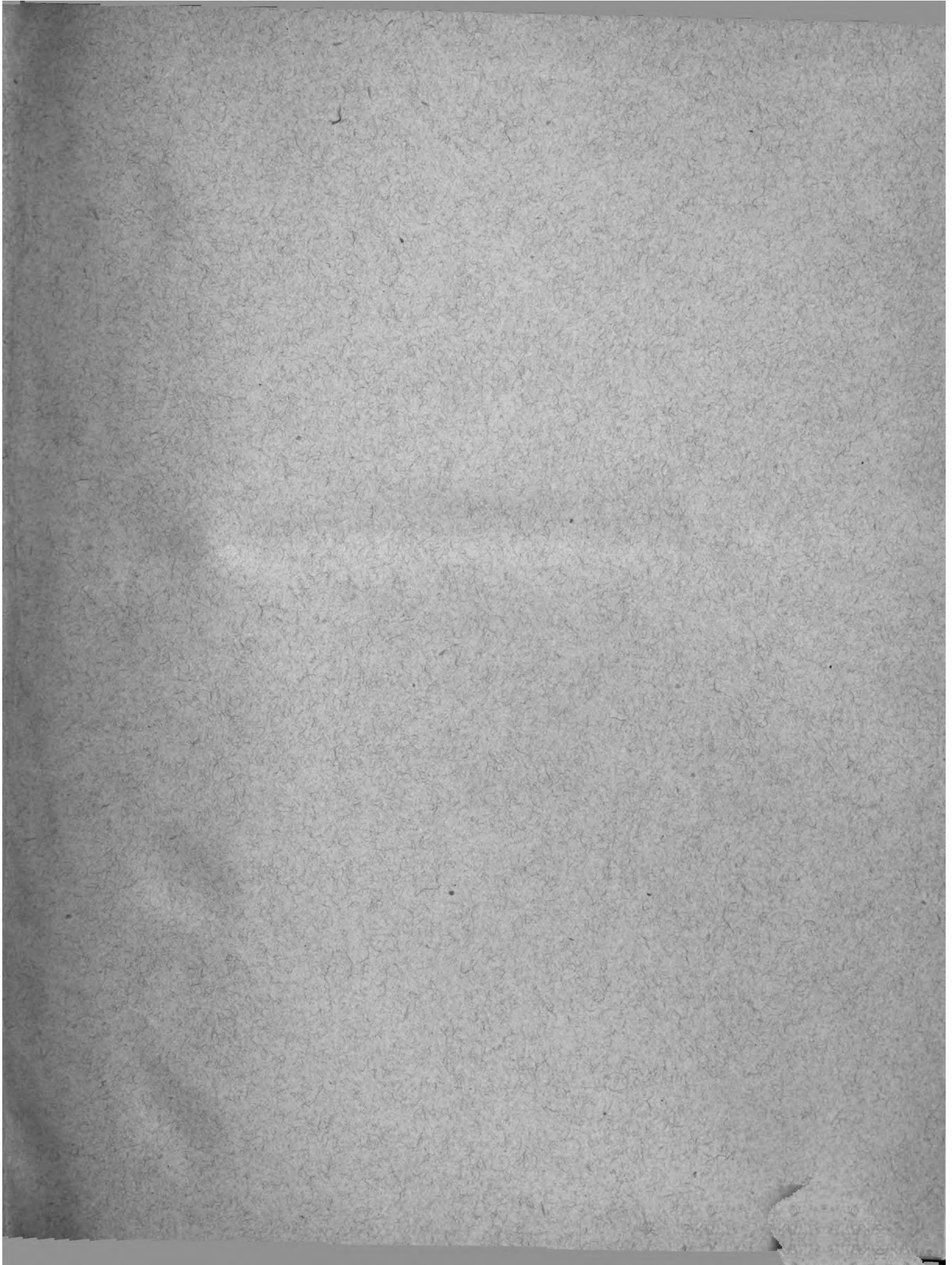
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INDEX TO VOL. IX.

JANUARY 1, 1906, to DECEMBER 15, 1906.

LIST OF AUTHORS.

- Adie, Col. J. R., I.M.S., 325.
 Alexander, Dr. David, 69.
 Anderson, J. F., 252.
 Austen, E. E., 98, 113.
 Balfour, Andrew, M.D., B.Sc., M.R.C.P., 81, 373.
 Branch, C. W., M.B., C.M., 102, 156, 374.
 Bremridge, R. H., M.A., M.B., 119.
 Brewers, I., M.D., 107.
 Cantlie, James, M.B., F.R.C.S., 181, 277, 312.
 Castellani, Aldo, M.D., 1, 36.
 Cleland, J. B., M.D., 296.
 Dalgetty, A. B., C.M., M.D., D.P.H., 165.
 Desai, V. G., L.M.S., 215.
 Dudgeon, G. C., F.E.S., 261, 326.
 Dudgeon, L. S., M.R.C.P., 261.
 Duncan, Andrew, M.D., B.S., M.R.C.P., 309.
 Duprey, A. J., M.R.C.S., L.R.C.P., 22.
 Eder, M. D., M.R.C.S., L.R.C.P., 159.
 Elkington, J. S., 73.
 Elliott, J. F., L.R.C.P.I., L.R.C.S.I.
 Fink, Major G. H., I.M.S., M.R.C.S., 310.
 Gauducheau, Surg.-Major, A., 52.
 Gerrard, P. N., M.D., D.T.M.H., 4, 347.
 Giles, Lieut.-Col. G. M., I.M.S., 99, 180, 153, 169, 182, 198, 217, 285.
 Gimlette, T. D., M.D., 149, 153, 173, 186, 198, 235, 262.
 Haran, James A., M.A., M.B., B.Ch., 32.
 Harford, C. F., M.D., 124.
 Hartigan, W., M.D., D.P.H., 15.
 King, Harold, 373.
 Koch, Dr. R., 75, 104, 137.
 Leitao, A. de S. Maia, M.D., 357.
 Leme, C. P., M.D., 129.
 Leys, James F., M.D., 47.
 Logan, O. T., M.D., 294.
 Madden, F. C., M.D., F.R.C.S., 293.
 Massey, Yale, B.A., M.D., C.M., 250.
 Paranhos, U., M.D., 129.
 Patton, Lieut. W. S., I.M.S., 73.
 Perry, Sir Allen, M.D., D.P.H., 36.
 Phillips, L. P., M.D., M.R.C.S., F.R.C.S., 23, 373.
 Rat, J. Numa, M.D., 135.
 Robertson, A., M.B., C.M., 329.
 Rosenau, J. M., 252.
 Ross, E. H., M.R.C.S., L.R.C.P., 17.
 Ross, Ronald, F.R.S., C.B., 341.
 Saigh, Selim, M.D., 341.
 Scharlieb, Mary, M.B., B.S., 113.
 Stanley, Arthur, M.D., 135.
 Terni, Dr. Camillo, 229.
 Travers, E. A. O., M.R.C.S., L.R.C.P., 197.
 Watson, Malcolm, M.D., D.P.H., 197.
 Wellman, F. C., M.D., 31, 97, 215, 328.
 Wright, Hamilton, M.D., 245.
 Ziemann, Dr. H., 353.

A

- Abscess, subhepatic, 181
 Abstracts, amebic dysentery, experimental reproduction of, 52; Carrion's disease, 159; Colonel Gorgas' monthly reports from the Canal Zone, Panama, 107; conditions affecting the location of missionaries on their return after furlough, 124; flies and cholera, 41; human trypanosomiasis, 253; mosquitoes and yellow fever, 54; paratyphoid fever and typhoid fever, 378; preventive treatment of disease, 105; tropical Australia, 73; tropical dysentery, 379.
 Acute contagious conjunctivitis in Ceylon, 36
 Address delivered at the opening of the winter session of the London School of Tropical Medicine, October, 1906, 318
 Aden Hinterland, culicid fauna of the, 78
 African poison test, 857
 Alimentary canal, the hygiene of the, 189
 Allen and Hanbury's works at Ware, inspection of, 274
 Amateurs, meteorology for, 220.
 Anæmia in Porto Rico, 135
 Anatomy of the biting flies of the genera *Stomoxys* and *Glossina*, 99, 153, 169, 182, 198, 217, 229
 ANGOLA, notes from, 81; tumour and cancer among the natives of, 271
 Anthrax œdema, malignant, in Central Africa, 250
 ANTI-MALARIAL campaign in Austria and Hungary, 361; sanitation in India, 104
 Apology, 351
 Appendicitis, 224
 Arrangements for 1906, 5
 Arthropods, blood-sucking, on a hemipterous insect which preys upon, 97
 Association, a tropical medical, 103
 ASSOCIATION, BRITISH MEDICAL, meeting at Toronto, 239, 270, 298

B

- Bacillus of Hamilton Wright obtained from two cases of acute beri-beri, 261
 Basutoland (Col. Med. Reports, 5, 7, 71)
 BERT-BERT, etiology of, 252; Hamilton Wright's bacillus obtained from two cases of acute, 261; mouldy rice: occurrence of beri-beri in the Sokor district, 262; restatement and reply to some criticisms, 245
 Birth-rate in the Punjab, 271
 Biskra as a health resort, 41
 Biting flies of the genera *Stomoxys* and *Glossina*, anatomy of the, 99, 153, 169, 182, 198, 217, 229
 Blood-sucking hemipteron, 373
 Blood-sucking insects in West Africa, distribution of, 353
 Bodies in the sputum and faeces resembling the eggs of parasites, 72
 Brazil, note on *tinea imbricata* in, 129
 British East Africa, an outline of plague as met with in, 32
 British Guiana (Col. Med. Reports), 92
 BRITISH MEDICAL ASSOCIATION, meeting of the, at Toronto, 239, 279, 298
 British spas, suitable for tropical residents: Harrogate, 268; Cheltenham, 274

C

- Cambridge, Dr. C. Harford's lecture at, 27
 Cancer and tumour among the natives of Angola, 271
 Carrion's disease, 159
 Case of the Indian hospital assistants, 350
 Central Africa, malignant anthrax œdema in, 250
 Ceylon, an outbreak of acute contagious conjunctivitis in, 36
 Cheltenham, 274
 Cholera and flies, 41
 Climatology, co-operative research in, 27

Clinical picture of relapsing fever, 215
 College of medicine for Chinese, Hong Kong, 53
 Colombo, leprosy in, 332
 Colonial climatic data, a plea for uniformity and greater official support in the collection of, 24
 Colonial economic notes, 162
 Colonial nursing association, 206
 Commission for the investigation of Mediterranean fever, report of the, 138
 Co-operative research in climatology, 27
 CORRESPONDENCE, 13, 45, 62, 94, 108, 126, 135, 158, 192, 202, 227, 241, 254, 301, 333, 351, 363
 Cuba and Panama, malaria in, 177
 Culicid fauna of the Aden Hinterland, 73
 Culicidal fumigation, experiments in practical, 360
 Cyprus (Col. Med. Reports, 75, 79)

D

Daily range of heat and humidity in tropical countries, 121
 Death of Dr. Stewart, 40
 Dengue in Egypt, 373
 Dengue in Port Sudan, 318
 DEPRECIATION OF THE ATTRACTION OF THE INDIAN MEDICAL SERVICE, 269; and its remedies, 38, 70
 Destructive ulcerous rhino-pharyngitis, 47
 Diet, the principles of, in tropical campaigns, 309
 Digestion and food in warm climates, 312
 Disease and horse-flies (*Tabanidae*), 98
 DISEASES met with in South Sylhet, India, 165; seen on the line of the projected Lobitokatanga railway, 328
 Distribution of blood-sucking insects in West Africa, 353
 Distribution of Liège exhibition awards, 205
 Dr. Charles Harford's lecture at Cambridge, 27
 Dysentery, tropical, 379

E

East Africa, results of a voyage of investigation to, 43, 75, 104, 137
 Eastern city, some striking facts about an, 119
Echinococcus multilocularis, 224
 EDITORIALS, 5, 24, 27, 38, 40, 51, 52, 70, 72, 73, 92, 103, 104, 121, 124, 132, 157, 176, 189, 190, 203, 204, 220, 237, 239, 251, 252, 268, 269, 279, 283, 297, 317, 318, 330, 331, 332, 350, 357, 358, 376
 Etiology of beri-beri, 252
 Experimental reproduction of amœbic dysentery by intravenous inoculation of pus from a hepatic abscess, 52
 Experiments in practical culicidal fumigations, 360

F

FEVER, paratyphoid and typhoid, 378; relapsing, 215; tick, 65; yellow, 191
 Fit and unfit persons for residence in warm climates, 15
 Flies and cholera, 41
 Food and digestion in warm climates, 312; of the natives of India, 310; trade and the public, 317
 Fronto-nasal cephalocoele, two cases of, 329
 Further report on measures taken in 1901 to abolish malaria from Klang and Port Swettenham in Selangor, Malay States, 197

G

Gambia (Col. Med. Reports, 53)
 Geographical distribution of disease, 195, 208, 257, 368
Glossina and *Stomoxys*, anatomy of, 99, 153, 169, 182, 198, 217, 229
 Gold Coast (Col. Med. Reports, 16, 19, 23, 27)
 Greece, malaria in, 299, 341, 351

H

HEMOGREGARINE OF MAMMALS, 296; and some notes on trypanosomiasis in the Anglo-Egyptian Sudan, 81
 Hamilton Wright, the bacillus of, obtained from two cases of acute beri-beri, 261
 Harrogate, 268

Health department, Shanghai, 193
 Heat and humidity, the daily range of, in tropical countries, 121
 Hemipteron, a blood-sucking, 373
 Hemipterous insect, on a, which preys upon blood-sucking arthropods, and which occasionally attacks mammals (man), 97
 Hong Kong, college of medicine for Chinese, 53
 Horse-flies (*Tabanidae*) and disease, 98
 Housing of Europeans on the West Coast of Africa, 376
 How to recognise the species of *Pulex* possibly concerned in the transmission of plague, 190
 HUMAN biting flies, occurrence and habits of some species of, 326; spirillosis in Loanda (Angola), 357; tick fever, an insect enemy of the disseminator of, in Angola, 113
 HYGIENE of the alimentary canal, 189; of travel in tropical Africa, 40
 Hygienic measures against syphilis, 203
 Hypnotic influence of the negro race, 102

I

Imperial Institute, 124
 Improved method of staining for Schuffner's dots, 206
 INDIA, anti-malarial sanitation in, 104; food of the natives of, 310; notes on plague in, 300; sanitary organisation in, 331; serum therapy of plague in, 204
 INDIAN hospital assistants, case of, 350; Government manifesto on plague prevention, 74; *Medical Gazette* on "growing," 134; medical service, depreciation of the attraction of, 269, and its remedies, 38; subordinate medical service, training of the, 203
 Insect enemy of the disseminator of human tick fever in Angola, 113
 Inspection of Allen and Hanbury's works at Ware, Hertfordshire, 274
 Intestinal lesions, chronic, and sprue, 277
 Is malaria as black as it is painted? 132
 Is yaws syphilis? 1

J

Jamaica, vomiting sickness in, 374
 Juvenile smoking, 360

K

Kitasato's suggestion of an international conference to fight plague, 297
 Koch on tuberculosis, 191

L

Leishman or other stains, a simple and cheap rocker for, 4
 LEPROSY, in Colombo, 332; pathology and treatment of, 330
 Lesson on the preservation of health in the Tropics, 157
 Leucocytosis, operation, 347
 Leucocytozoon found in the *Mus rattus* in the Punjab, 325
 LIVERPOOL SCHOOL OF TROPICAL MEDICINE, 92, 237, 377, 386
 Livingstone College, 12, 221
 Loanda, human spirillosis in, 357
 LONDON SCHOOL OF TROPICAL MEDICINE, 205, 253; address delivered at the opening of the winter session of the, October, 1906, 318

M

Maintenance of health by women in the mission field, 113
 MALARIA, a simple preventive against, 283; in Cuba and Panama, 177; in Greece, 299, 341, 351; is it as black as it is painted? 132; measures taken in 1901 to abolish, from Klang and Port Swettenham, 197
 Malay Peninsula, the puru of the, 149, 173, 182
 Malignant anthrax œdema in Central Africa, 250
 MALTA FEVER in Shanghai, 135; is it peculiar to Malta? 23; mode of infection in, 17
 Mammals, the haemogregarine of, and some notes on rats, 296
 Medical aid, problem of, in semi-civilised countries, 51
 MEDICAL ASSOCIATION, BRITISH, the meeting of the, at Toronto, 239, 279; tropical, 103
 Medical notes, 141, 243

Mediterranean fever, report of the commission for the investigation of, 133
Meeting of the British Medical Association at Toronto, 239, 270, 298
Meteorology for amateurs, 220
Mode of infection in Malta fever, 17
Mosquito, notes, 130; worms of Trinidad and their real nature, 22

N

Natives of India, food of, 310
Negro race, hypnotic influence of, 102
New aspect in the pathology and treatment of leprosy, 330
Nile boils, 293
North Nigeria, notes from, 69
Northern Nigeria (Col. Med. Reports, 8, 11, 15, 62, 63)
NOTE ON a leucocytozoon found in *Mus rattus* in the Punjaub, 325; on the habits of, *Ornithodoros moubata*, 215; the tinea imbricata in Brazil, 129
NOTES AND NEWS, 14, 55, 79, 95, 108, 127, 141, 161, 178, 195, 207, 227, 242, 255, 272, 288, 301, 335, 355, 364, 387
NOTES from Angola, 31; from North Nigeria, 69; on diseases met with in South Sylhet, India, 165; on plague in India, 300; on rats and the hamogregarine of mammals, 296; on some of the more obvious disease conditions seen on the line of the projected Lobitokatanga railway, 328
Nubian woman, rodent ulcer in a, 373

O

Obituary Notices, 111, 254, 324
OCCURRENCE and habits of some species of human biting flies, 326; of beri-beri in the Sokor District, 262
ON a hemipterous insect which preys upon blood-sucking arthropods and which occasionally attack mammals (man), 97
Operation leucocytosis, 347

ORIGINAL COMMUNICATIONS:—

Anatomy of the biting flies of the genera *Stomoxys* and *Glossina*, by Lieut.-Col. G. M. Giles, I.M.S., 99, 153, 169, 182, 198, 217, 235
Bacillus of Hamilton Wright obtained from two cases of acute beri-beri, by Leonard Dudgeon, M.R.C.P., 261
Beri-beri; mouldy rice; the occurrence of beri-beri in the Sokor District, by John D. Gimlette, M.R.C.S., L.R.C.P., 262
Beri-beri: a re-statement and reply to some criticisms, by Hamilton Wright, M.D., 245
Blood-sucking hemipteron, by H. H. King, 373
Clinical picture of relapsing fever, by V. G. Desai, L.M.S., 215
Dengue in Egypt, by L. Phillips, M.D., B.C., F.R.C.S., M.R.C.P., 873
Dengue in Port Sudan—Red Sea Province, Sudan, by Selim Saigh, M.D., 348
Etiology of beri-beri, 252
Fit and unfit persons for residence in warm climates, by W. Hartigan, M.D., D.P.H., 15
Food and digestion in warm climates, by James Cantlie, M.B., F.R.C.S., 312
Food of the natives of India, by Major G. H. Fink, I.M.S., M.R.C.S., L.S.A., 310
Further report on measures taken in 1901 to abolish malaria from Klang and Port Swettenham, by E. A. O. Travers, M.R.C.S., L.R.C.P., and Malcolm Watson, M.D., D.P.H., 197
Hamogregarine of mammals and some notes on rats, by J. B. Cleland, M.D., Ch.M., 296
Hamogregarine of mammals and some notes on trypanosomiasis in the Anglo-Egyptian Sudan, by Andrew Balfour, M.D., B.Sc., M.R.C.P., D.P.H., 81
Horse flies (*Tabanidae*) and disease, by E. E. Austen, 98
Human spirillosis in Loanda (Angola), by A. de S. Maia Leitao, M.D., 357
Hypnotic susceptibility of the negro race, by C. W. Branch, M.B., C.M., 102
Insect enemy of the disseminator of human tick fever in Angola, by E. E. Austen, 113

Is Malta fever peculiar to Malta? by L. P. Phillips, M.D., M.R.C.S., F.R.C.S., 23
Is yaws syphilis? by Aldo Castellani, M.D., 1
Malaria in Greece, by Ronald Ross, F.R.S., C.B., 341
Malignant anthrax oedema in Central Africa, by A. Yale Massey, B.A., M.D., 250
Mosquito notes, by Lieut.-Col. G. M. Giles, I.M.S., 130
Mosquito worms of Trinidad and their real nature, by A. J. Duprey, M.R.C.S., L.R.C.P., 22
Nile boils, by F. C. Madden, M.D., F.R.C.S., 293
NOTE ON a leucocytozoon found in *Mus rattus* in the Punjaub, by Col. J. R. Adie, I.M.S., 325
NOTE ON the habits of *Ornithodoros moubata*, by F. C. Wellman, M.D., 215
NOTE ON the tinea imbricata in Brazil, by U. Paranhos, M.D., and C. P. Leme, M.D., 129
NOTES from Angola, by F. C. Wellman, M.D., 31
NOTES from North Nigeria, by Dr. D. Alexander, 69
NOTES ON diseases met with in South Sylhet, India, by A. B. Dalgetty, C.M., M.D., 165
NOTES ON some of the more obvious disease conditions seen on the line of the projected Lobitokatanga railway, by F. C. Wellman, M.D., 328
Occurrence and habits of some species of human biting flies belonging to the families *Tabanidae* and *Muscidae* (*Glossina*) from the West Coast of Africa, by G. C. Dudgeon, F.E.S., 326
ON a hemipterous insect which preys upon blood-sucking arthropods, and which occasionally attacks mammals (man), by F. C. Wellman, M.D., 97
Operation leucocytosis, by P. N. Gerrard, B.A., M.D., 347
Outbreak of acute contagious conjunctivitis in Ceylon, by Sir Allen Perry, M.D., D.P.H., and Aldo Castellani, M.D., 86
Outline of plague as met with in British East Africa, by James A. Haran, M.A., M.B., 32
Principles of diet in tropical campaigns, by Andrew Duncan, M.D., B.S., M.R.C.P., F.R.C.S., 309
Puru of the Malay Peninsula, by T. D. Gimlette, M.D., 149, 173, 186
Question of the mode of infection in Malta fever, by E. H. Ross, M.R.C.S., L.R.C.P., 17
Rhino-pharyngitis mutilans, by C. W. Branch, M.B., C.M., 156
Rhino-pharyngitis mutilans, by J. F. Leys, M.D., 47
Rodent ulcer in a Nubian woman, by Andrew Balfour, M.D., 373
Simple and cheap rocker for Leishman and other stains, by P. N. Gerrard, M.D., 4
Some striking facts about an Eastern city, by R. H. Bremridge, M.A., M.B., 119
Sprue and chronic intestinal lesions, by James Cantlie, M.B., F.R.C.S., 277
Studies in plague, by Prof. Dr. C. Terni, 229
Subhepatic abscess, by James Cantlie, M.B., F.R.C.S., 181
Suggestions for the maintenance of health by women in the mission field, by Mary Scharlieb, M.B., B.S., 113
Three cases of infection with *Schistosoma japonicum* in Chinese subjects, by O. T. Logan, M.D., 294
Two cases of fronto-nasal cephalocele, by A. Robertson, M.B., C.M., 329
Verruga peruana, by M. D. Eder, M.R.C.S., L.R.C.P., 213
Vomiting sickness in Jamaica, by C. W. Branch, M.B., C.M., 374
Organisation of the medical service of the native army of India, 358
Ornithodoros moubata, note on the habits of, 215
Outbreak of acute contagious conjunctivitis in Ceylon, 86
Outline of plague as met with in British East Africa, 32

P

Panama and Cuba, malaria in, 177
Parasites, bodies in the sputum and faeces resembling the eggs of, 72
Paratyphoid and typhoid fever, 378
Pathology and treatment of leprosy, 330
PERSONAL NOTES, 59, 77, 109, 145, 162, 179, 195, 208, 227, 243, 257, 273, 290, 303, 337, 356, 366, 386
Philippine Journal of Science, 191

- PLAGUE, 80, 95, 111, 177, 291, 303; an outline of, as met with in British East Africa, 32; and flies, 127; how to recognise the species of *pulex* possibly concerned in the transmission of, 190; in India, notes on, 300; in India, serum therapy of, 204; Kitasato's suggestion of an international conference to fight, 297; prevention of, Indian Government manifesto on, 74
- Plea for uniformity and greater official support in the collection of colonial climatic data, 24
- Poison test, the African, 357
- Porto Rico, anemia in, 135
- Precise definition of diseases, 360
- Preliminary statements on the results of a voyage of investigation to East Africa, 43, 75, 104, 137
- Prescriptions, 146, 301, 303
- Preservation of health in the Tropics, 157
- Principles of diet in tropical campaigns, 309
- Prizes, Belillios and Sivewright, 251
- Prizes offered for the discovery of the typhus fever germ, 271
- Problem of medical aid in semi-civilised countries, 51
- Professor Elie Metchnikoff, 176
- Public and the food trade, 317
- Pulex*, how to recognise the species of, possibly concerned in the transmission of plague, 190
- PUNJAB, birth-rate in, 271; leucocytozoon found in *Mus rattus* in the, 325
- Puru of the Malay Peninsula, 149, 173, 186
- Q
- Question of the mode of infection in Malta fever, 17
- R
- Rats, notes on, and the haemogregarine of mammals, 296
- RECENT AND CURRENT LITERATURE, 14, 30, 46, 57, 79, 95, 112, 128, 146, 163, 179, 195, 209, 224, 228, 243, 258, 275, 292, 304, 338, 356, 360, 388
- Report of the commission for the investigation of Mediterranean fever, 138
- REPORTS, on beri-beri, 225; health of British Navy, 283; health of Hong Kong, 240
- Residence in warm climates, fit and unfit persons for, 15
- REVIEWS:—
- A Few Hints on the Care of Children at Sea, by Samuel Syngé, M.A., M.D., M.A.O., B.Ch.(Dub. Univ.), L.M. (London: J. Bale, Sons and Danielsson, Ltd., Great Titchfield Street, W., price 1s. net), 354
- Anæsthetic Technique, for Operations of the Nose and Throat, by A. de Prenderville (London: H. T. Glaisher, 1906, pp. 88, illustrated), 207
- Animal Parasites of Man, a Handbook for Students and Medical Men, by Dr. Max Braun; third enlarged and improved edition, with 294 illustrations in the text, translated from the German by Pauline Falcke, brought up to date by Louis W. Sambon, M.D. (Naples), and Fred. V. Theobald, M.A. (London: John Bale, Sons and Danielsson, Ltd., Great Titchfield Street, W., 1906, price 21s. net), 177
- Beri-beri—Observations in the Federated Malay States on Beri-beri, by C. W. Daniels, M.B.Camb., M.R.C.S., late Director, Institute for Medical Research Kuala Lumpur, F.M.S. (London: E. G. Berryman and Sons, Blackheath Road, S.E., 1906, pp. 105, price 3s. 6d.), 140
- Blood-sucking Flies and How to Collect Them, by E. E. Austen (British Museum), 108
- Courmont, J., of Lyons, on the Atmosphere, and C. Lesieur, of Lyons, on Climatology, in a Treatise on Hygiene, published by P. Brouardel and E. Mooney, T. 1, fascic. i., pp. 124 (Paris: J. B. Baillière, 1906), 126
- Extra Pharmacopœia, by Martindale and Westcott, Twelfth Edition (London: H. K. Lewis, 136, Gower Street, London, W.C., 1906), 301
- Handbook of Climatic Treatment, including Balneology, by W. R. Huggard, M.A., M.D., F.R.C.P. (London: Macmillan and Co., 1906), 29
- Handbook of Climatology, by Dr. Julius Hann, translated from the Second German Edition by Robert de Courcy Ward (New York and London: Macmillan and Co., part i.), 28
- Illustrated Key to the Cestode Parasites of Man, by C. H. Wardell Stiles (Washington, 1906, pp. 104), 363
- A Japanese Text-book on Plague, by Dr. Tohiu Ishigami, Superintendent Bacteriological Institute, Osaka, Japan, formerly Assistant Bacteriologist to Professor Kitasato; revised by Professor Shibasaburo Kitasato, Tokyo, Japan; translated, enlarged and illustrated with Pathogenic Horticulture by Donald MacDonald, M.B., C.M.(Glas.), late Consulting Bacteriologist to the South Australian Government; 152 illustrations, 3 plates. (Adelaide, Vardon and Pritchard, Gresham Street, 1905), 385
- Lectures on Tropical Diseases, being the Lane Lectures for 1905, delivered at Cooper Medical College, San Francisco, U.S.A., August, 1905, by Sir Patrick Manson, K.C.M.G. (London: Archibald Constable and Co., 16, James Street, Haymarket, S.W., 1905, pp. 230, illustrated, price 7s. 6d.), 94
- Management of a Plague Epidemic, by E. F. Gordon Tucker, (Calcutta: Thacker, Spink and Co., Government Place, 28 pp.), illustrated, price 1.8 rupees, 161
- Medical Diseases of Egypt, by F. M. Sandwith, M.D., F.R.C.P., (London: Henry Kimpton, 13, Farnival Street, Holborn, E.C., 1905, part i., pp. 316), 193
- Nature and Treatment of Cancer: Some Methods of Hypodermic Medication in the Treatment of Inoperable Cancer, by John A. Shaw-Mackenzie, M.D.Lond., third edition, revised and enlarged (London: Baillière, Tindall and Cox, Henrietta Street, Covent Garden, 1906, pp. 99, price 2s. 6d. net), 177
- Notes, by Ernest Edward Austen, Assistant Department of Zoology, British Museum (N.H.), 1906, pp. 74, with 34 coloured plates. Printed by order of the Trustees of the British Museum (London, 1906, price 25s.), 254
- Nutrition and Dysentery, by Lieutenant-Colonel U. N. Mukerji, M.D., I.M.S., (Rtd.) (Calcutta: S. K. Lahiri and Co.), 240
- Patent Foods and Patent Medicines, two lectures, by Robert Hutchison, M.D., F.R.C.P., second edition (London: J. Bale, Sons and Danielsson, Ltd., Great Titchfield Street, W., 1906, price 1s. net), 61
- Principles of Treatment and their Application to Practical Medicine, by J. Mitchell Bruce, M.A., M.D., LL.D., F.R.C.P., third edition (Edinburgh and London: Young J. Pentland, 1906, demy 8vo, pp. 614), 388
- Reports of the Expedition to the Congo, 1908-5, by the late J. Everett Dutton, M.B.Vict., and John L. Todd, B.A., M.D., C.M.McGill; with Descriptions of Two New Dermatomyssid Acarids, by Robert Newstead, A.L.S., F.F.S., &c., and The Anatomy of the Proboscis of Biting Flies, by J. W. W. Stephens, M.D.Cantab., and Robert Newstead, A.L.S., F.F.S., &c., March, 1906 (London: Published for the Committee of the Liverpool School of Tropical Medicine by Williams and Norgate, 14, Henrietta Street, Covent Garden, price 7s. 6d. net), 237
- Scientific Memoirs, by Officers of the Medical and Sanitary Departments of the Government of India; On a Parasite found in the White Corpuscles of the Blood of Palm Squirrels, by Captain W. S. Patton, M.B., I.M.S. (Calcutta: Office of the Superintendent of Government Printing, India, 1906), 241
- Simple Guide to the Preservation of Health in South Africa, by H. Strachan, C.M.G., M.R.C.S., L.R.C.P., P.M.O. Lagos, West Africa, Second Edition, 72
- With the Abyssinians in Somaliland, by Major J. Willes Jennings, R.A.M.C. (Hodder and Stoughton), 61
- Rhino-pharyngeal lesions in yaws, 135
- Rhino-pharyngitis mutilans (destructive ulcerous rhino-pharyngitis), 47, 156
- Rodent ulcer in a Nubian woman, 373
- S
- Saint Lucia (Col. Med. Reports, 66, 67, 71)
- Sanitary organisation in India, 331
- Sanitation, anti-malarial, in India, 104
- Santyl, 139
- Schaudinn memorial, 332
- Schistosoma japonicum* in Chinese subjects, three cases of infection with, 294
- Schuffner's dots, an improved method of staining for, 206

Scorpion poison, 30
 Serum therapy of plague in India, 204
 Seychelles (Col. Med. Reports, 82, 83, 87, 91)
 SHANGHAI Health Department, 193; Malta fever in, 135
 Simple and cheap rocker for Leishman or other stains, 4
 Simple preventive against malaria, 283
 Sivewright prize, 251
 Sleeping sickness, 291
 Somaliland Protectorate (Col. Med. Reports, 50, 51)
 Some notes on trypanosomiasis in the Anglo-Egyptian Sudan, and a hæmogregarine of mammals, 81
 Some of the regulations concerning plague, cholera, and yellow fever drawn up during the Second International Sanitary Convention of American States, October, 1905, 54
 Some points of interest in tropical work during 1905, 6
 Some striking facts about an Eastern city, 119
 Southern Nigeria (Col. Med. Reports, 55, 59)
 South Sylhet, diseases met with in, 165
 Special food preparations, 316
 Sprue and chronic intestinal lesions, 277
Stomoxys and *glossina*, anatomy of, 99, 153, 169, 182, 198, 217, 229
 Straits Settlements (Col. Med. Reports, 31, 35, 39, 43, 47)
 Studies in plague, 229
 Study of the cause of sudden death following the injection of horse serum, 252
 Subhepatic abscess, 181
 Sudan, dengue in, 348
 Suggestions for the maintenance of health by women in the mission field, 118
 SYPHILIS, hygienic measures against, 203; is it yaws? 1

T

Tabanidæ (horse-flies) and disease, 98
 Three cases of infection with *Schistosoma japonicum* in Chinese subjects, 294
 Tick fever, 65
Tinea imbricata in Brazil, 129
 Toronto, meeting of the British Medical Association at, 239, 279, 298
 Training of the Indian subordinate medical service, 203
 Transmission of plague, how to recognise the species of *Pulex* possibly concerned in the, 190

Treatment and pathology of leprosy, 330
 Trinidad (Col. Med. Reports, 3)
 Trinidad, the mosquito worms of, and their real nature, 22
 TROPICAL Africa, the hygiene of travel in, 40; campaigns, principles of diet in, 309; countries, the daily range of heat and humidity in, 121; Medical Association, 103; medical work during 1905, some points of interest in, 61; residents, British spas suitable for, 268
 Tropical dysentery, 379
 TROPICAL MEDICINE, Liverpool School of, 92, 237, 377; London School of, 205
 Tropics, a lesson on the preservation of health in the, 157
 Trypanosomiasis in the Anglo-Egyptian Sudan, and a hæmogregarine of mammals, 81
 Tuberculosis, Koch on, 191
 Tumour and cancer among the natives of Angola, 271
 Two cases of fronto-nasal cephalocele, 329
 Typhus fever germ, prizes offered for discovery of, 271

U

Ulcer, Zambesi, 64
 University of Cambridge, 292

V

Verruga peruana, 213
 Vomiting sickness in Jamaica, 374

W

Warm climates, fit and unfit persons for residence in, 15; food and digestion in, 312
 West Africa, distribution of blood-sucking insects of, 353
 West Coast of Africa, housing Europeans on the, 376

Y

Yaws, is it syphilis? 1
 Yaws, rhino-pharyngeal lesions in, 135
 Yellow fever, 191

Z

Zambesi ulcer, 64

COLONIAL MEDICAL REPORTS.

No. 16, Trinidad (contd.), 3
 .. 17, Basutoland, 5, 7
 .. 18, Northern Nigeria, 8, 11
 .. 19, Northern Nigeria, 15
 .. 20, The Gold Coast, 16, 19, 23, 27
 .. 21, The Straits Settlements, 31, 35, 39, 43, 47
 .. 22, Somaliland Protectorate, 50, 51
 .. 23, Gambia, 53

No. 24, Southern Nigeria, 55, 59
 .. 25, Northern Nigeria, 62, 63
 .. 26, Saint Lucia, 66, 67, 71
 .. 27, Basutoland, 71
 .. 28, Grenada, 74
 .. 29, Cyprus, 75, 79
 .. 30, Seychelles, 82, 83, 87, 91,
 .. 31, British Guiana, 92

LIST OF ILLUSTRATIONS.

- JANUARY 1st, 1906, Plate, Is Yaws Syphilis?
- JANUARY 15th, 1906, Illustration to accompany article "Mosquito Worms"
- FEBRUARY 1st, 1906, Plate illustrating article "Preliminary Statement on the Results of a Voyage of Investigation to East Africa"
- FEBRUARY 15th, 1906, Illustration to accompany article "Rhino-pharyngitis Mutilans"
- MARCH 1st, 1906, Temperature charts to illustrate article "Tick Fever"
- MARCH 15th, 1906, Plate and illustrations to article "A Hæmogram of Mammals, and some Notes on Trypanosomiasis in the Anglo-Egyptian Sudan"
- APRIL 2nd, 1906, Plate, Thos. E. Charles, M.D., LL.D., Edin., F.R.C.P. Lond.
Illustrations to accompany article "On a Hemipterous Insect which Preys upon Blood-sucking Arthropods and which occasionally Attacks Mammals (Man)"
Illustrations to accompany article "The Anatomy of the Biting Flies of the Genera *Stomoxys* and *Glossina*"
- APRIL 16th, 1906, Plate, London School of Tropical Medicine, 20th Session, January to April, 1906
Charts to illustrate article "The Daily Range of Heat and Humidity in Tropical Countries"
- MAY 1st, 1906, Illustration to accompany article "Mosquito Notes"
- MAY 15th, 1906, Illustrations to accompany article "The Anatomy of the Biting Flies of the Genera *Stomoxys* and *Glossina*"
- JUNE 1st, 1906, Illustrations to accompany article "The Anatomy of the Biting Flies of the Genera *Stomoxys* and *Glossina*"
- JUNE 15th, Plate, Outline Figures of Fleas possibly concerned in the Transmission of Plague
Plate to illustrate article "The Puru of the Malay Peninsula"
Illustrations to accompany article "The Anatomy of the Biting Flies of the Genera *Stomoxys* and *Glossina*"
- JULY 2nd, 1906, Plate to accompany article "The Anatomy of the Biting Flies of the Genera *Stomoxys* and *Glossina*"
- JULY 16th, 1906, Illustrations to accompany article "The Anatomy of the Biting Flies of the Genera *Stomoxys* and *Glossina*"
Plate, London School of Tropical Medicine, 21st Session, May to July, 1906
- AUGUST 1st, 1906, Illustrations to accompany article "The Anatomy of the Biting Flies of the Genera *Stomoxys* and *Glossina*"
- AUGUST 15th, 1906, Illustrations to accompany article "Malignant Anthrax Oedema in Central Africa"
- OCTOBER 1st, 1906, Illustrations to accompany article "Three Cases of Infection with *Schistosoma japonicum* in Chinese Subjects"
- NOVEMBER 1st, 1906, Plate to accompany article "Notes on Disease Conditions seen on the Line of the Projected Lobitokatanga Railway"
Illustrations to accompany article "Note on a Leucocytozoon found in the *Mus Rattus* in the Punjab"
- NOVEMBER 15th, 1906, Plate, London School of Tropical Medicine, 22nd Session, October to December, 1906
- DECEMBER 15th, 1906, Plate to accompany article "Rodent Ulcer in a Nubian Woman."
Illustration to accompany article "A Blood-sucking Hemipteron."



General eruption.



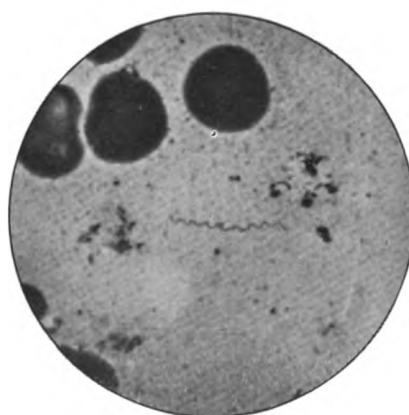
Yaws. General eruption.



General eruption



White scar at the seat of the primary growth.



Spirochete of the *pallida* type.



Scar at place of primary growth.

To Illustrate Dr. ALDO CASTELLANI's article, "Is Yaws Syphilis?"

Original Communications.

IS YAWS SYPHILIS?

By ALDO CASTELLANI, M.D.

Colombo, Ceylon.

To everyone interested in tropical medicine the theory is well known according to which yaws (fram-bœsia, parangi, pian, &c.) is simply a form of syphilis. This theory, supported by so high an authority as J. Hutchinson, has raised much discussion. The medical men practising in those parts of the Tropics where yaws is endemic are divided into separate camps: those who believe in this theory, and those who consider yaws to be a distinct disease. Among the latter some recognise, however, that the anti-syphilitic treatment is effective also in yaws, while others affirm that mercury and potassium iodide are quite worthless.

At the suggestion of Sir Allan Perry—to whom I am greatly indebted—I have studied several cases of yaws in Ceylon, and may be permitted, therefore, to express the conclusions to which I have myself arrived in regard to the nature of the disease. I may say at once that in my opinion yaws is not syphilis. It seems to me that the study of the geographical distribution, the clinical symptoms, and the histo-pathology show clearly the two diseases to be different.

Geographical Distribution.—At the present time syphilis is practically pandemic; yaws, on the other hand, is localised to some parts of the Tropics (Ceylon, Assam, Java, West Indies, West Africa, &c.). Yaws is extremely common in Ceylon, extremely rare in India. Syphilis is frequent in both countries.

In Samoa, according to Turner, syphilis was unknown up to at least 1880, while yaws has been endemic ever since the group was discovered. In Fiji, too, up till a few years ago syphilis was not present, while yaws was almost universal. Daniels has made the interesting observation that in British Guiana yaws in late years has disappeared, while syphilis is still rampant.

Symptoms and Course.—After an incubation period varying in length, but generally not exceeding three to four weeks, characterised often by signs of malaise, rheumatoid pains, headache, irregular rises of temperature, a *primary sore*, if it may be called so, appears at the seat of inoculation, which is generally extra-genital. I have never myself seen the primary lesion in its very first stage, as all my cases were in later periods of the disease. I have very little doubt, however, about its presence. The natives are very positive about it. Moreover, in Ceylon at any rate, they are in the habit of cauterising it themselves in a primitive way, so that a white scar remains plainly visible. This scar, which is usually of rather large dimensions, in all my cases was extra-genital; in women it was very often found on one of the mammæ, in men and children on the trunk and arms.

The primary growth at the seat of inoculation is apparently quite different from the primary sore of syphilis. From the description given by natives it would seem to appear as a rather large fungoid

growth, covered with a crust, not very dissimilar from the elements of the general eruption which appears later on. This large, single, projecting tubercle is called "mother yaw" or "maman pian" in French patois. By the Samoans it is called "ta'rr" or "leader" (Turner). This primary growth may remain single for several weeks and even months. It often heals before the general eruption begins.

Before the typical general eruption of yaws begins some furfuraceous, whitish, pruriginous patches appear on the trunk and limbs. These may coalesce and cover large portions of the body. Some of them may disappear, leaving the skin without lustre and rough. Others may remain for the whole course of the disease. It is on these furfuraceous patches that according to many writers the elements of the general eruption appear; in my experience, however, these may develop also on parts of the skin absolutely normal.

The general typical eruption of yaws makes its appearance in the form of papules. These are at first small, often flattened, and with the epidermis intact. They may disappear, or more often they increase in size, become moist, and are soon covered with a crust yellowish or brownish in colour, formed of desiccated secretion; if the crust is removed a raw surface will be observed throwing up coarse red or yellowish fungoid granulations secreting a thin, slightly purulent secretion which soon dries into a crust again. These papillomatous growths are of various size, and practically may be found on any part of the body; they are extremely common on the upper and lower limbs, and on the face; very rare on the scalp. They may remain of the same appearance and size for months; often after a few weeks the secretion diminishes, and a process of hyperkeratosis sets in; they become of much harder consistency, and some of them, especially on the feet, may be covered with numerous hard, verrucose-like small protuberances.

Generally within three to six months in children, and six to twelve months in adults, the yaws dry up, shrink and disappear, leaving dark hyper-pigmented spots in their site. In some cases the eruption is very persistent and appears in successive crops; in other cases large irregular ulcers may develop showing often in their centre reddish papillomatous masses which in my experience do not usually heal spontaneously.

Constitutional symptoms of severe nature are generally absent during the whole course of the disease in ordinary cases; the physical examination of the internal organs does not reveal anything abnormal; a few superficial lymphatic glands may be enlarged, but in my experience this is not a constant feature. The analysis of urine does not present anything abnormal. The stools may contain ova of various worms, but this is also a frequent occurrence in normal natives.

The Blood.—In all my cases in which the blood was examined a certain degree of anæmia, never very severe, was present. The number of red blood corpuscles varied from 3,800,000 to 4,400,000; the hæmoglobin index (Fleish) from 60 to 75. The red blood corpuscles did not show anything abnormal in their shape. On several occasions I noticed a comparatively large number of polychromatic erythrocytes staining blue instead of pink with Leishman's method.

Many of these basophile red cells were micro-erythrocytes.

The leucocytes varied from 7,000 to 12,000 per cmm. In the majority of cases an increase was noticeable in the number of the large mononuclear, even when there was no sign and no history of malaria. In almost all the cases the eosinophiles were increased, this being due probably to the presence of intestinal worms as revealed by the microscopical examination of the stools, which showed frequently ova of *Ascaris lumbricoides*, *Tricocephalus dispar*, and, in a few instances, of *Ankylostoma duodenalis*.

I attach a table giving the results of the examination of blood in four typical cases with no history of malaria, and in which no ova of ankylostomata were found in the feces, although eggs of other worms (*Ascaris lumbricoides* and *Tricocephalus dispar*) were present.

Case	Hæmoglobin	Red Blood Cells per c.mm.	Leucocytes per c.mm.	DIFFERENTIAL COUNT OF LEUCO- CYTES (% WITHOUT FRACTIONS)				
				Polimorpho- nuclear	Large mononuclear	Small mononuclear	Transition forms	Eosinophiles
1. Woman	65	3,900,000	11,000	46	84	9	3	7
2. Boy	70	4,000,000	9,000	41	26	25	6	2
3. Girl	60	3,500,000	7,000	64	15	11	2	8
4. Girl	65	4,100,000	10,000	52	20	15	3	10

The interesting point shown by the examination of the blood is the increase in the number of the large mononuclear leucocytes. This is of frequent occurrence, though not constant. An increase in the mononuclear has been noticed also in syphilis by several writers, it is, however, very common in many diseases of protozoal origin, as shown by Manson, &c.

From the brief clinical sketch given of yaws, it will be seen that the disease presents the following principal features in contrast to syphilis: Primary sore, if it may be so-called, generally extra-genital; eruption of one type only, viz., the papule which proliferates into a papillomatous growth; extremely well-marked pruritus. Moreover, in yaws *sequela* comparable to tertiary syphilis or parasymphilitic conditions are absent or extremely rare, though it must be admitted that our knowledge on this point is far from being complete. It is also to be noted that yaws is not hereditary and not congenital.

Pathology.—MacLeod, in his excellent paper on the "Histo-pathology of Yaws," calls attention to the following differential points between yaws and syphilis:—

(1) The proliferative changes in the epidermis are much more marked in yaws than in syphilis. When the yaws has reached a certain stage a well-marked hyperkeratosis is noticeable which is rare in syphilis.

(2) The blood-vessels in the yaws granulomata have no tendency to thickening, nor is there any endothelial proliferation such as occurs in syphilitic gummata.

(3) The plasma cells in yaws form a more diffuse infiltration, and retain their original type better than in any other of the granulomata.

MacLeod rightly states that these differential histological details must be considered collectively, as there is no individual histological character, which exceptionally might not be present both in syphilis and yaws.

Examining films from yaws granulomata stained by Leishman's method it is interesting to note the very large number of polychromatic red blood cells of very different dimensions; some much larger than the normal erythrocytes, others very much smaller. Sometimes these polychromatic cells have a granular appearance.

The leucocytes frequently contain in their protoplasm, and sometimes also in their nuclei, roundish or oval, more or less deeply blue-stained bodies. These I believe to be probably basophile microerythrocytes engulfed by phagocytes.

Inoculation Experiments in Man and the Lower Animals.—The experiments of Paulet and Charlouis are well known. Paulet (1848) inoculated fourteen negroes with the secretion taken from yaws granulomata. All of them developed yaws, the incubation period varying from twelve to twenty days, when at the place of inoculation in ten cases the first nodule of yaws appeared, soon followed by a typical general eruption. In two cases apparently the eruption did not start from the seat of inoculation.

The more recent investigation of Charlouis (1881) is most important. He first took four cases of yaws and inoculated them under the skin at various spots with the secretion of their own yaws: in three cases at the places of inoculation typical yaws granulomata developed. Charlouis also inoculated thirty-two Chinese prisoners—who had never suffered from the disease—with crusts and scrapings of a yaws. In twenty-eight cases the disease developed, beginning always from the seat of inoculation.

Moreover, Charlouis, to a native suffering from typical yaws, inoculated syphilis. The inoculation was quite successful, a primary syphilitic sore developing, followed by all the usual types of secondary eruptions.

That yaws patients are not immune against syphilis is proved also by Powell, who describes two very interesting cases of syphilis supervening on yaws.

The lower animals, as far as we know, are refractory to yaws. In Ceylon, I tried to inoculate an anthropoid monkey, following the technique used by Metschnikoff and Roux for syphilis. The inoculation did not succeed. It would be premature, however, to come to the conclusion that the disease cannot be inoculated into monkeys. Numerous experiments on various species of monkeys are necessary.

Etiology.—Various bacteria have been described in yaws: Eijkmann found some peculiar bacilli; Pariez observed numerous micrococci; Breda described a bacillus which he called "Boubas, or Frambæsia bacillus"; Powell, in 1896, cultivated in two cases a yeast which was present in the granuloma and also between the epithelial cells.

Nicholls and Watts, in 1899, found in the granulomata a coccus which they cultivated in pure cultures. The same coccus was found once in the lymphatic glands. Inoculation into animals did not succeed.

Personal Researches.—Fourteen cases of yaws were examined by me in Ceylon. In the open sores and

fully developed yaws all sorts of bacteria were present, cocci, sarcinae, bacilli. When the eruption elements are, however, in the very first stage, not moist, and with the epidermis intact, no bacteria, according to my experience, are found either microscopically or by culture methods; instead of that, rare spirochætæ may be observed.

A preliminary note on the presence of spirochætæ in cases of frambœsia was published on June 17th, 1905, in the *Journal* of the Ceylon Branch of the British Medical Association. Other cases of yaws showing spirochætæ have been communicated by me at the meeting of the British Medical Association, Leicester, July, 1905, and several more cases described in the *British Medical Journal*, November 18th, 1905.

Technique.—Films are made in the usual way from scrapings of the eruptions. It is advisable to select lesions in which a secondary pyogenic infection has not yet taken place. Giemsa stain, which I have used only lately, gives good results, but Leishman's method gives also very good results, if the staining is done according to the following instructions:—

(1) Let the alcoholic solution of Leishman act for five minutes without fixing the films previously.

(2) Mix the stain with equal or double amount of distilled water, and let it act for half an hour to several hours.

(3) Wash with distilled water and leave a few drops of it on the films as usual for half to one minute.

(4) Blot and examine with very high power.

Morphology of the Spirochætæ.—In non-ulcerated lesions, and sometimes also in open sores of yaws, there may be found an extremely delicate organism which morphologically, in the present state of our knowledge, I do not think can be distinguished from the *S. pallida* of Schaudinn. The organism takes up generally a pale reddish tint when stained by Leishman's or Giemsa's method. It is extremely thin, some individuals are, however, thicker and better stained than others, though always much thinner than any spirochæte of the *refringens* type. The extremities are often pointed, but possibly due to the manipulation of the film, forms may be met with presenting blunt extremities, or one extremity blunt and the other pointed. In a few individuals one of the extremities may present a rather large roundish or pear-shaped expansion.

The length varies from a few microns to 18 and 20 microns, and even more. The number of waves varies also, but they are generally rather numerous, uniform, and of small dimensions. Sometimes a portion of the spirochæte shows numerous narrow, uniform waves, while the rest of it has no waves at all. Sometimes, also, two spirochætæ may be attached together, or apparently twisted one on the other. Two organisms close together and nearly parallel, but united at one end as described in *Spirochæte pallida*, by Schaudinn, have been seen. On the minute structure of the parasite I have not any observation of importance, but in a few individuals I have observed a few chromatoid points here and there.

In rare cases, several preparations presented, besides the spirochætæ, some peculiar bodies, extremely rare. These bodies are generally oval or roundish, 5 to 8 microns in length and 4 to 6 in breadth.

Sometimes they may have smaller or much larger dimensions.

In preparations stained by Leishman's method these bodies are stained slightly purplish or bluish, and contain chromatin. The chromatin may be collected at one point near one of the extremities, or scattered at several points. Whether these bodies have anything to do with a developmental stage of the spirochæte I cannot yet say.

Spirochætæ Found in Open Sores of Frambœsia.—The fungoid ulcerations are invaded very quickly by all sorts of germs. Besides innumerable bacteria, often spirochætæ of various kinds are present. One form is rather thick, and takes up easily the stain; it is morphologically identical with the *S. refringens* of Schaudinn.

Another form is thin, delicate, with waves varying in size and number, and with blunt extremities; I proposed for this variety the name of *S. tenuis obtusa*. A third form is also thin and delicate, but is tapering at both ends: I named it *S. tenuis acuminata*. The spirochætæ of the *pallida* type, as found in non-ulcerated lesions, may also be present.

Recapitulating, I have examined for spirochætæ altogether fourteen cases of yaws, the search being positive in eleven. In one case the spirochætæ of the *pallida* type were present also in films from an excised gland. The spirochætæ found in the non-open lesions and some of those found in open sores of yaws are, in my opinion, morphologically identical with the *S. pallida* of Schaudinn. This is also the opinion of Schaudinn himself who very kindly has examined several of my specimens. My observations have been recently confirmed by Wellman in one case and by Powell in another.

Even supposing that future investigations should confirm these observations, it will be by no means proved that syphilis and yaws are the same disease. The leprosy bacillus, the tubercle bacillus, and many other acid-fast bacteria are morphologically identical; however, leprosy is not tuberculosis. It is also practically impossible to distinguish morphologically the surra from the nagana trypanosome, but the two diseases are different.

I believe, that if future investigation will prove that yaws is a spirochæte disease, the yaws spirochætæ will have to be considered to be biologically different from the spirochæte of syphilis.¹

Treatment.—According to my experience there is no doubt that the anti-syphilitic treatment is effective also in yaws, although I do not deny at all that some cases may recover spontaneously. In any stage of yaws potassium iodide in *large doses* is much more effective than mercury. As there are authors who state that this treatment is useless, I kept four typical cases of yaws without any treatment for a certain time. One remained stationary, three got worse and worse. In one of these—a woman—for humanity's sake I had to give up the experiment after four weeks, numerous large fungoid ulcerations having developed. The symptom of which she complained the most and for which she was continuously begging for some remedy, was the unbearable pruritus. As soon as

¹ In such a case the name I suggested of *S. pertenuis* (June, 1905) *seu Pallidula* (November, 1905) might be a proper one.

potassium iodide in anti-syphilitic doses was administered this symptom decreased remarkably in intensity and finally disappeared, the eruption also soon getting better.

The potassium iodide cure doing good in yaws is considered as an argument in favour of the disease being a form of syphilis. The fallacy of this argument is shown by the fact that potassium iodide has a very beneficial effect on another disease quite different from syphilis, viz., actinomycosis.

Conclusions.—The clinical symptoms, the geographical distribution, the histo-pathology of *frambœsia tropica* show many points of difference from syphilis. The presence of a spirochæte of the *pallida* type in some cases is not sufficient, for the reasons already stated, to come to the conclusion that the two maladies are the same entity. I agree, therefore, with such authorities on yaws as Manson, Powell, Daniels, Jeanselme, Sambon, &c., that syphilis and yaws, though closely allied, are two different diseases.

REFERENCES.

- BARRETT. Pathological Society, November, 1905.
 CASTELLANI. *Journal of the Ceylon Branch of the British Medical Association*, June, 1905; Meeting of the British Medical Association, Leicester, July, 1905 (proceedings of which appeared in the *Lancet* and *JOURNAL OF TROPICAL MEDICINE*, August, 1905); *British Medical Journal*, November, 1905.
 DANIELS. *British Journal of Dermatology*, November, 1896.
 JEANSELME. "Cours de Dermatologie exotique."
 MACLEOD. *British Medical Journal*, 1902.
 MANSON. "Tropical Diseases."
 POWELL. *British Journal of Dermatology*, 1898; Pathological Society of London, November, 1905, &c.
 WELLMAN. *JOURNAL OF TROPICAL MEDICINE*, December 1, 1905.

A SIMPLE AND CHEAP ROCKER FOR LEISHMAN OR OTHER STAINS.

By P. N. GERRARD, M.D.(Dublin), D.T.M.H.(Camb.).
Krian Perak, Federated Malay States.

HAVING suffered many times and oft from the "tricks" of Lieut.-Col. Leishman's excellent stain, necessity at length drove me to make the rocker of which I enclose rough diagrams, and since the adoption of which I have had the greatest comfort and infinitely better results than before I made it. The materials used by me were as follows:—

- One small piece of a deal box, say 6 in. by 5 in. by $\frac{3}{4}$ in.
- Four lengths of thin bamboo.
- One piece of ordinary string.
- Two trouser buttons.
- The shot from two cartridges, or two bullets.
- Two fingers of an old white glove.
- About two dozen ordinary pins and two surgical needles.

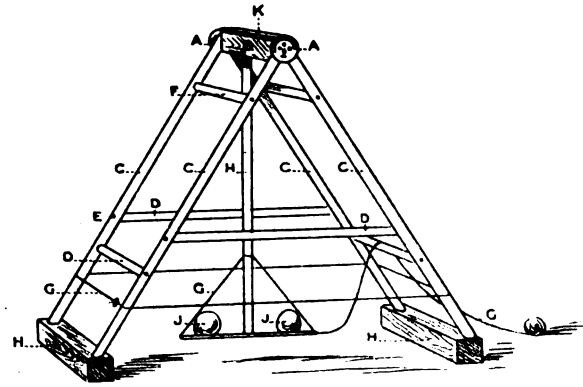
The time taken to make the machine, about an hour and a half.

The diagrams explain the construction.

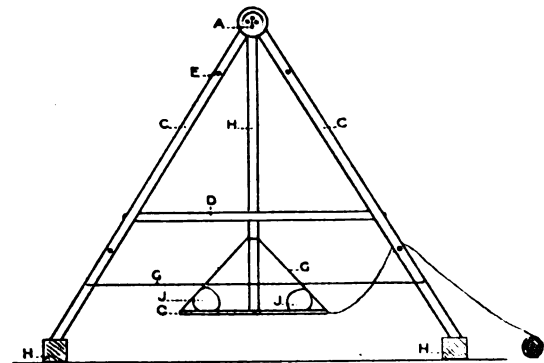
I find it works best if the stain is poured on the slide and the string then pulled, the rocking continues for about ninety minutes, depending, of course, upon the length of the supports and the weight of the shot-

bags, the length in mine being 12 in., exclusive of the small square block which steadies the machine.

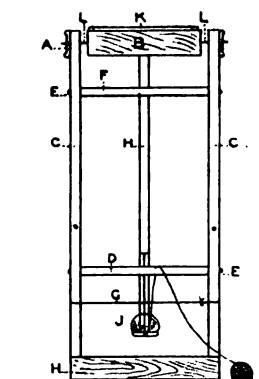
I use it on my pathology table, with two or three sheets of blotting paper under it to catch the dropping water when the stain is flushed off.



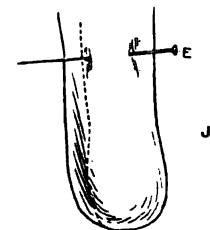
- A.—Trouser button.
 B.—Solid squared piece of deal.
 C.—Bamboo.
 D.—Bamboo spreader.
 E.—Pins.
 F.—Wooden spreader.
 G.—String.
 H.—Wood.
 I.—One No. 7 split.
 J.—Shot-bags.



- C.—Bamboo. J.—Shot-bag.



- K.—Slide with stain (N.B., lengthwise).
 L.—Surgical needle.
 J.—Shot-bag.



- E.—Pin.
 J.—Shot-bag.

After the stain has been on about ninety minutes the rocker is almost at a standstill, and the dilution is carried out from a syphon tube (into a whisky bottle containing rain-water, filtered).

The rocking is again started and when it has slowed after the usual ninety minutes or so, another tug at the string will give another ninety minutes, and flushing can then be performed, the waste trickling down the pendulum to be absorbed by the blotting paper below. This dries in about three hours in the Tropics, and I find I have no difficulty from flooding in using the rocker three times a day, namely, for about two hours before breakfast, two hours after tiffin (one o'clock), and sometimes between 5.30 and 6.30.

I trust this may be of assistance to all who recognise the impossibility of "running" hospitals in the Tropics nowadays without a careful study of hæmic conditions.

I shall be happy to supply any further details required.

VICTORIA. MEDICAL LEGISLATION.—A Bill about to be presented to the Government of Victoria, Australia, is to the effect that no degrees will be recognised from universities other than the United Kingdom or a British possession, unless it appears to the Medical Board that such universities recognise the medical graduates of the University of Melbourne, and that Melbourne graduates are permitted to register in the country of the university. A clause is introduced prohibiting any persons but registered medical practitioners (and chemists) from dispensing medicine or rendering to any person medical or surgical aid for fee. The penalty for evading these provisions is fixed at £50.

Yellow Fever.

COLONEL WILLIAM C. GORGAS, Chief Sanitary Officer for the Canal Commission in his report for the month of August, 1905, publishes some interesting yellow fever statistics for the period from July 1st, 1904, to September 1st, 1905, a *résumé* of which is given below.

CASES OF YELLOW FEVER IN PANAMA, COLON, AND THE CANAL ZONE.

	No. of Cases	No. of Deaths	Mortality Percentage
Employees of the Canal Commission appointed from the U.S.	69	14	20.3
Employees of the Canal Commission appointed from the Isthmus	43	10	23.2
Employees of the Panama Railroad Company	9	2	22.2
Persons not employees of the Commission or Railroad	83	38	45.8
Transients to and from foreign ports	26	10	38.5

During this period 116 cases occurred in Panama, 57 cases in Colon, and 33 cases in the Canal Zone proper.

During August, 1905, there were 27 cases of yellow fever on the Isthmus.

[We are obliged to Dr. Isaac Brewer, U.S.A., for this information.—ED.]

Business Notices.

1.—The address of the **JOURNAL OF TROPICAL MEDICINE** is Messrs. BALE, SONS & DANIELSSON, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All literary communications should be addressed to the Editors.

3.—All business communications and payments, either for subscriptions or advertisements, should be sent to the Publishers of the **JOURNAL OF TROPICAL MEDICINE**. Cheques to be crossed The Union Bank of London, Ltd.

4.—The Subscription, which is **Eighteen Shillings** per annum, may commence at any time, and is payable in advance.

5.—Change of address should be promptly notified.

6.—Non-receipt of copies of the Journal should be notified to the Publishers.

7.—The Journal will be issued on the first and fifteenth day of every month.

Reprints.

Contributors of Original Articles will be supplied **FREE** with six copies of the Journal if a request accompany the MS. If reprints are required they will be supplied by the publishers, if the order is given with remittance when sending the MS. The price will be as below:—

50 Copies of four pages, 5/-;

100 " " " 6/-;

200 " " " 7/6;

50 Copies beyond four up to eight pages, 8/6;

100 " " " 11/-;

200 " " " 14/6.

One page of the Journal equals 3 pp. of the reprint.

If a printed cover is desired the extra cost will be for 50 Copies, 5/6; 100 Copies, 6/6; 200 Copies, 7/6.

THE

Journal of Tropical Medicine

JANUARY 1, 1906.

ARRANGEMENTS FOR 1906.

To-day we commence the ninth volume of the Journal. The Journal of 1905 increased in bulk considerably beyond any of its predecessors, a feature which some proprietors of journals consider a subject to be congratulated upon, but which it has been our endeavour, in view of the enormous amount of literature produced at the present day, and in the desire that the **JOURNAL OF TROPICAL MEDICINE** shall be read from start to finish, we have attempted to avoid. No department of medical literature has increased in amount in the same proportion as that to which the **JOURNAL OF TROPICAL MEDICINE** is devoted, so that it is impossible to carry out the promise with which we started, that this Journal should be one as concise as possible in order to ensure its being read.

We think it may be of interest to readers to know what arrangements have been made for the future.

The Editors have had the good fortune to secure the able services of the following medical colleagues as coadjutors in the foreign literary work of the Journal:—

T. P. BEDDOES, M.B., (Cambridge), F.R.C.S. (England), for French, Spanish and Portuguese literature.

J. CAMPBELL GRAHAM, M.A., M.D., for German and Dutch literature.

J. E. NICHOLSON, Lieut.-Col. R.A.M.C. (Rtd.), for Italian, French and Spanish literature.

We have been indebted to Lieut.-Col. Nicholson and Dr. Beddoes for the past year or two for their help and co-operation in the department of foreign literature, and it is satisfactory to know that we are to continue to be benefited by their help.

Contributors sending Articles representing really Good Original Work to be Paid.

We have long felt that original articles representing really good original work sent to the JOURNAL OF TROPICAL MEDICINE should be paid for, and we have induced the proprietors to apportion a certain sum to that end. The amount at the disposal of the Editors will not allow of anything but small payments, yet we are satisfied it is a move in the right direction, and we hope our contributors will approve of the step.

The proprietors desire we should draw attention to the conditions which have always obtained in this Journal concerning reprints. A contributor of an original article is entitled to six copies of the Journal free. Should, however, reprints be desired, notice must be sent to that effect before the article is published; a small charge is made for reprints under these conditions.

The inclusion of the Colonial Medical Reports was the most important feature of the Journal during 1905. Through the kindness of the authorities of the Colonial Office we have been permitted to publish these valuable contributions, and we hope, by our doing so, the highly important and systematic records of disease from every part of the Empire lying in tropical latitudes have proved practically useful to medical practitioners

in the Tropics, and will be found reliable for reference to future statistical and epidemiological writers.

SOME POINTS OF INTEREST IN TROPICAL MEDICAL WORK DURING 1905.

SLEEPING SICKNESS.

THE members of the Sleeping Sickness Commission of the Royal Society in a summary of their work state, in the No. 4 Report by E. D. W. Greig, Captain I.M.S., their conclusions:—

“(1) That the disease is at first a specific polyadenitis caused by the *Trypanosoma gambiense*.

“(2) That, in addition to enlargement of lymphatic glands, the blood shows a constant lymphocytosis at all stages of the disease.

“(3) That sleeping sickness is the last stage of this disease, and is invariably fatal. It consists, essentially, in a polyadenitis, plus signs and symptoms due to changes in the nervous system; the onset of these signs and symptoms synchronises with the entrance of the *T. gambiense* into the lymph spaces of the nervous system; this is accompanied by a rise of the mononuclear elements in the cerebro-spinal fluid.

“(4) That the resistance of both men and monkeys to the *T. gambiense*, as judged by the duration of the early stage, varies greatly, and probably a certain proportion, not yet exactly determined, acquire sufficient immunity to arrest the development of the disease at that stage.

“(5) That the action of arsenic *in vivo* on the *T. gambiense* is partial. It destroys a number of the trypanosomes, and probably these act as immunising agents. Its administration in the stage of polyadenitis tends to help the natural resistance to combat the disease.

“(6) That bacterial invasion, chiefly coccal, occurs in some cases, but only in the very last days of the sleeping sickness stage, and therefore cannot determine the onset of this phase of the malady.

“(7) That, in addition to the *T. gambiense*, other varieties of trypanosoma occur in Uganda, which are pathogenic to animals.

“(8) That these trypanosomes differ entirely from *T. gambiense* in morphology and animal reactions.

ment by Staff-Surgeon Shaw, from the ordinary sweat (bacteria-bearing) of a Malta fever patient an agglutinative reaction was obtained. Experiments made to ascertain the presence of *M. melitensis* in the expired air of Malta fever patients, all proved negative; nor could monkeys be infected by the injection of broth infected by the expired air of Malta fever patients.

It has often been stated that Malta fever was caught from the polluted sea-water in the harbour of Malta, but experiment proved that the *M. melitensis* could not be detected in the sea-water of the harbour.

In the Fourth Report of the Mediterranean Commission, Major Horrocks gives details of "Experiments of the Mode of Conveyance of the *Micrococcus melitensis* to Healthy Animals." By experiments on monkeys it was shown that the inhalation or ingestion of infected dust will give rise to Malta fever in monkeys; and the ingestion of infected food (milk) proved positive, but whether the organism was absorbed by the stomach or by the mouth or throat was not determined.

The infection of healthy monkeys by contact with infected monkeys is probably through the urine excreted and not by bodily contact. The experiments made with the mosquito—*Stegomyia fasciata*—to test the possibility of the mosquito transmitting the disease proved negative in Major Horrocks's hands, although Dr. Zammit reported several cases that seemed to point to the possibility of the mosquito being the agent of transmission.

In Report Five, by Staff-Surgeon R. T. Gilmour, is given a "Description of a Method of Cultivating the *Micrococcus melitensis* from Small Quantities of Peripheral Blood and Inoculation Experiments with the Micro-organisms Isolated."

In quantities of so small amount as 1.0 cc. withdrawn from a vein of a Malta fever patient, and of this quantity 0.1 cc. in broth medium of which but 10 cc. was injected, a positive result was obtained.

Report Six, by Dr. T. Zammit, on "Isolation of the *Micrococcus melitensis* from the Blood," contains the technique to be observed in drawing blood from patients suffering from Malta fever, and the laboratory methods followed for cultivation.

Report Seven, by Staff-Surgeon E. A. Shaw, contains an "Interim Report of Experimental Work in the Investigation of Mediterranean Fever dealing with Blood, Skin, Sweat, Inoculations, Agglutinating Serum, and various Inoculations in Different Animals."

Shaw's conclusions are: (1) *M. melitensis* exists in the blood of patients in relatively very small amount, the smallest quantity of blood in which it has been found, $\frac{1}{16}$ cc., is practically the equivalent of 4 c.mm. This small amount of bacilli in the blood is interesting when the question of transmission of infection by mosquitoes is considered. (2) No definite relation can be established between any given stage of the disease and the presence of *M. melitensis* in the blood. (3) There is some indication of a diurnal variation in its presence in the blood. (4) No relation can be established between the agglutinating power of a patient's blood for *M. melitensis* and the amount of the latter present in the blood. (5) *M. melitensis* does not pass through Chamberland, F., nor Berkefeld filters, IV., V., or VI.

The most important practical point determined by the Commission was the discovery by Dr. Zammit, in June, 1905, that the goats in Malta are infected by the *M. melitensis*, that the coccus can be isolated from the milk of infected goats, and that the urine of these animals contains the specific organism. As the milk supply in Malta is chiefly derived from the goat, it is readily understood how important this discovery is. The udders of the goats are usually very large, actually touching the ground, and it is plain that the udder may become contaminated by the urine-polluted soil, so that both by mechanical means and by the secretion of milk itself the milk supply may be contaminated.

The whole constitutes a fine piece of scientific work, and the members of the Commission are to be congratulated on their work, which promises to be eminently successful in staying the ravages of this scourge in Malta. The reports received from time to time that Malta fever has been met with in places other than Malta, and perhaps Gibraltar, have to be received with some hesitation, for except perhaps the reports from Orange River Colony, in but few cases have we any authority for pronouncing the disease to be Malta fever, except from clinical evidence alone.

BERI-BERI.

Next in importance to the work accomplished in Malta fever during 1905 is perhaps that of Dr. Hamilton Wright in connection with beri-beri. Dr. Wright may not have completely proved his point, but his conclusions have been arrived at after prolonged and careful study and investigation, and if he has done no more than to direct our attention into other channels of study in elucidating this mysterious disease he has contributed towards widening the field

of investigation. But Dr. Wright would seem to have done more than that, for he has by clinical and pathological demonstrations succeeded in presenting to us beri-beri in a new aspect and on a convincingly clear scientific basis. Dr. Wright's observations and conclusions are summarised as follows:—

... That beri-beri is an acute or subacute infectious disease of short incubation period. That it is due to a specific micro-organism not yet isolated. That this specific organism is not one whose special habitat is a particular food, such as rice or fish, but one that may, nevertheless, be ingested with any food or drink accidentally contaminated. That this organism, having gained entrance to the alimentary canal, multiplies in the contents and mucosa of the stomach and small gut, but chiefly in the contents and mucosa of the pylorus and duodenum. That it there elaborates an extracellular toxin, which, being immediately absorbed, poisons the peripheral terminations of, first, the vagi to the stomach and heart, and then other efferent, afferent, and autonomic neurones to different extents and degrees, thus giving rise to groups of symptoms which may be broadly classified as acute pernicious beri-beri, acute, and subacute beri-beri. That these cases run a definite course of about five or six weeks, and on the elimination of the causal organism and its toxin the poisoned neurones recover and the patient becomes whole again, or that the poisoned neurones only partially recover, and there develops in those of them which do not a true degeneration which migrates centralwards. For this persistent atrophy, and the various paralyses, atrophic disturbances, and œdema which result, Wright has proposed the term "beri-beric residual paralysis."

This view of the clinical history of beri-beri points to a gastro-duodenitis as the primary local lesion in the complaint, and is supported by actual clinical observations of patients. The paralysis is a late development or even a sequela of the disease: as in diphtheria paralysis supervenes after the acute signs and symptoms have subsided, as in plague the bubo is subsequent to gastro-intestinal lesions, so in beri-beri we find an alimentary preceding the neural and other evidences of the disease.

The etiology of the gastro-duodenitis has not yet been worked out, but Dr. Wright suggests a bacillary origin, and that it is by way of the feces that the infecting organism or material escapes from the body. Acting on this grounded belief he applied it to the treatment of the disease in a gaol at Kuala Lumpur,

and was successful in practically eradicating the disease from amongst the prisoners in the gaol, which for many years had been subjected to virulent and persistent outbreaks of beri-beri.

PLAGUE.

There is little to record concerning plague, except that it continues to prevail in the several haunts we have associated with the disease for several years. The persistency of plague when once it has established itself in a town or district is characteristic of the disease, as it has been known from early times. This fact alone, in addition to the actual mortality it entails, is sufficient to explain the dread of its appearance and the extraordinary precautions taken to prevent its inroads.

India remains the chief centre of the disease in the world at present, and except in China, no other country could have withstood the mortality which prevails there and continued to play its part in the economy of nations.

During the first six months of 1905 no fewer than 878,602 persons died of plague in India. This is the largest mortality for any period of six months yet recorded, for it is 151,971 in excess of the corresponding period of 1904, which up to 1905 presented the highest death-rate since plague appeared in India.

During the months August to November, 1905, the mortality from plague has been much reduced in India, so that possibly the death-rate for the year may be under one million, and if that proves to be true the total for 1905 will be under that of 1904, when the deaths from the disease numbered 1,034,787.

The diminution may actually prove that the virulence of the disease is abating, or it may only be a wave of subsidence with which we are familiar in the history of the disease.

Inoculation is making considerable, if not wholly satisfactory, headway in India, but more is being done in this direction than is generally known. Certain it is that inoculation affords marked protection against plague, and also considerably diminishes the case mortality of those attacked.

Haffkine's method of inoculation is the one at present followed, and there seems every reason to consider it the best. The report of Major E. Wilkinson, I.M.S., founded on work done during 1902-03 is satisfactory evidence of protection. In a community of 827,427 persons 639,630 were not inoculated, 187,797 were inoculated; of the former 29,723 died of plague, whilst

among the latter there were only 814 deaths from the disease. Had the 187,797 not been inoculated the presumed number of deaths would have been 8,680, in place of the 814 which actually did occur. But by the inoculation it would appear that some 7,866 lives, or stated in percentages 90.62 per cent., were saved by the inoculation.

A report from Aden by Mr. E. S. Winter also confirms the efficacy of inoculation, and from several parts of India we have similar accounts. Stated broadly, it appears that inoculation affords well-nigh an eightfold degree of immunity; and when plague has developed amongst an inoculated community, less than half the number of deaths occur than amongst those not inoculated.

We are indebted to W. J. Simpson, Hunter and Bell, in Hong Kong, for a more clear clinical history of plague than any yet advanced. These observers showed that plague was in most instances a disease set up by infection by way of the alimentary canal, and that the bubo is a rather late development in the illness. Gastric and intestinal lesions precede the lymphatic gland enlargements. They at the same time admit the possibility of a direct pneumonic infection. This view of plague was a great stimulus to further investigation and afforded a key to prophylaxis.

The vexed question of the relation of plague in rats to plague in man is not yet settled. There can be no doubt that men and rats suffer in common from the disease, but whether they are both infected by some common agent or whether they stand to each other as cause and effect is not determined. The suggestion that the black and brown rats play different parts in the disease was first mentioned by Cantlie in 1897, and the idea has been elaborated since then. The black rat—the *Mus rattus*—is more a household pest than is the *Mus decumanus*, or brown (Norwegian) rat, which lives chiefly in drains and outhouses; and it is considered possible that the geographical distribution of these rats aids in determining the geographical distribution of plague in man.

YELLOW FEVER.

Around the Gulf of Mexico yellow fever prevailed during July, August, and September of 1905, and even in October and during November cases of the disease were reported. New Orleans seemed to be the chief centre of the outbreak. Cases were first notified in New Orleans in July and up to the end of the

second week in November, when the disease seemed to have well-nigh wholly subsided, some 3,400 persons were attacked by yellow fever. The deaths from the disease numbered 451, a mortality rate of 13.20 per cent. only. The only other town on the northern littoral of the Gulf of Mexico where yellow fever seemed rife was at Pensacola, a town situated in Florida, close to the Alabama frontier, and only a short distance by sea from New Orleans. In Pensacola 560 cases and 80 deaths were reported, again furnishing a remarkably low death-rate, some 14.28 per cent. only. It is a curious turning of the tables that Havana, the home of yellow fever in Cuba for some 150 years, and the centre from which the disease formerly spread to the Gulf of Mexico ports, should during the recent outbreak have been taking rigid quarantine steps against infection from New Orleans and other ports. Since the determined suppression of yellow fever in Havana some two or three years ago the city has been practically free from the disease, and the few cases that occurred during 1905 were described as imported cases merely.

Yellow fever was stamped out in Havana by the practical application of the belief that the *Stegomyia fasciata* mosquito is the means by which the disease is transmitted. This plan of yellow fever prophylaxis was practised also in New Orleans and elsewhere, but not until the disease had got a fairly firm hold upon the communities.

The treatment of the disease has not advanced beyond treatment by "general principles." An initial purge, a vapour bath, a mustard bath to the feet, stimulants, alcohol, strychnine and caffeine when indicated, diuretics and hot wet packs for suppression of urine, constitute the sum and substance of yellow fever treatment at present.

TICK FEVER.

Excellent work in the elucidation of tick fever has been done by J. L. Todd, by the late T. Everett Dutton, and by Drs. Ross and Milne in the Congo Free State. A spirochæte has been demonstrated to be the specific agent in the causation of human tick fever. The *Ornithodoros moubata* (Murray) is the tick by which the spirochæte is transmitted from animal to animal, and monkeys also have been infected experimentally by allowing ticks to bite them.

Human tick disease was described by Livingstone. He first noticed the disease in Portuguese South Africa, and he also mentions being annoyed by the tick whilst

staying at Nyangwé in 1871. The natives in the tick-infected districts have always declared that the bite of the animal caused illness, but it was not until 1904 that their contention was absolutely proved by scientific investigation.

THE COURSE OF THE DISEASE.

Incubation Period.—One week.

Invasion, Signs, and Symptoms.—The onset is sudden, but a distinct rigor has not been noted. The patient is suddenly prostrated and complains of headache, bone-ache, and back-ache. Vomiting generally obtains at the commencement of illness. Diarrhœa is fairly constant, but constipation may occur. There are usually three or four attacks of fever, each attack lasts from three to four days, with marked relapses extending from a period of five to as many as nineteen days. The temperature during the feverish attacks may rise towards the evening to as high as 104° F. or to over 105° F. The attacks usually end in a marked perspiration. The most notable feature of the disease is the extreme prostration which prevails during the febrile attack and the sudden recovery of spirits and the feeling of fitness as soon as the temperature falls to normal. The spleen is sometimes enlarged. Herpes, epistaxis and hiccough have been recorded during the attacks.

The *spirochæta*, when numerous, can be readily seen in fresh preparations of blood as rapidly moving spiral threads. When the parasites are scanty in number the best method of demonstrating their presence is by de hæmoglobinising a thick blood film and staining by some modification of Romanowsky's method, or a weak solution of carbol-fuchsin.

The distribution of the human tick in the Congo Free State is interesting. Livingstone says before the Arabs came to the country bugs were unknown, and that wherever the Arab traders went the bugs were met with. This holds good at the present day, for tick fever is confined to the commercial highways; these are the old caravan routes and the rivers. It is probable, however, that ticks reached the Congo Free State from the east, carried by the Arabs, and from the Portuguese territory to the south.

The conclusions arrived at by Drs. Dutton and Todd are:—

(1) Tick fever is clinically identical with relapsing fever, and has for pathogenic agent a spirochæte.

(2) The spirochæte is probably *Spirochæte obermeieri*.

(3) The tick *Ornithodoros moubata* can transmit the spirochæte from animal to animal.

(4) The transmission is not merely mechanical, but some developmental process is carried on in the tick.

(5) A considerable degree of immunity or tolerance to the spirochæte can probably be acquired.

J. C.

LIVINGSTONE COLLEGE.

THE annual report of Livingstone College for the year 1905 is one which must serve to encourage all those engaged in furthering the admirable work which is being so ably conducted there. By the acquisition of a neighbouring plot of land, through the generosity of Mr. Robert Barclay, the College has been freed of the possibility of being overlooked by cheap dwellings, which were contemplated being built close by. The medical education given by the Principal, Dr. C. F. Harford, and other members of the staff has proved of pronounced benefit to missionaries proceeding to up-country districts in tropical countries. The marvel is that the number of students at the College have been so few; for one cannot conceive missionary societies sending men or women to outlying parts of the world, where no medical men are available for advice, without their having previously availed themselves of the opportunities afforded by the Livingstone College, whereby not only the health of the missionaries themselves may be better maintained, but also the physical welfare of the natives who come to them for spiritual instruction.

That the College is fulfilling its functions in a circumspet manner cannot be better gathered than from the statement made by Dr. Donald MacAlister, President of the General Medical Council, at the lecture on "Risks to Health in the Tropics, their Relation to Imperial Expansion and Missionary Enterprise," given at Cambridge on November 22nd, 1905, by Dr. C. F. Harford. Dr. MacAlister said:—

"If you like to quote me you may do so as saying that I have watched with interest, and perhaps some solicitude, the development of Livingstone College. I had doubts lest its initial purpose of giving to missionaries about to settle in tropical countries such lessons in the elements of hygiene and of medical and surgical first aid should be diverted to that of enabling imperfectly trained or unqualified men to pose as doctors in foreign parts. If that doubt had been confirmed, I, as official guardian of the Medical Register, would not be there that night; but I had satisfied myself that this was neither the purpose nor the effect of the training afforded at Livingstone College. I was sure that so long as a medical man so excellently qualified by experience, knowledge and prudence as Dr. Harford was responsible for the instruction given and the policy pursued, nothing but good could result to missionaries and their flocks from the fact that they had passed through the College."

We propose to deal more fully with the report in our next issue.

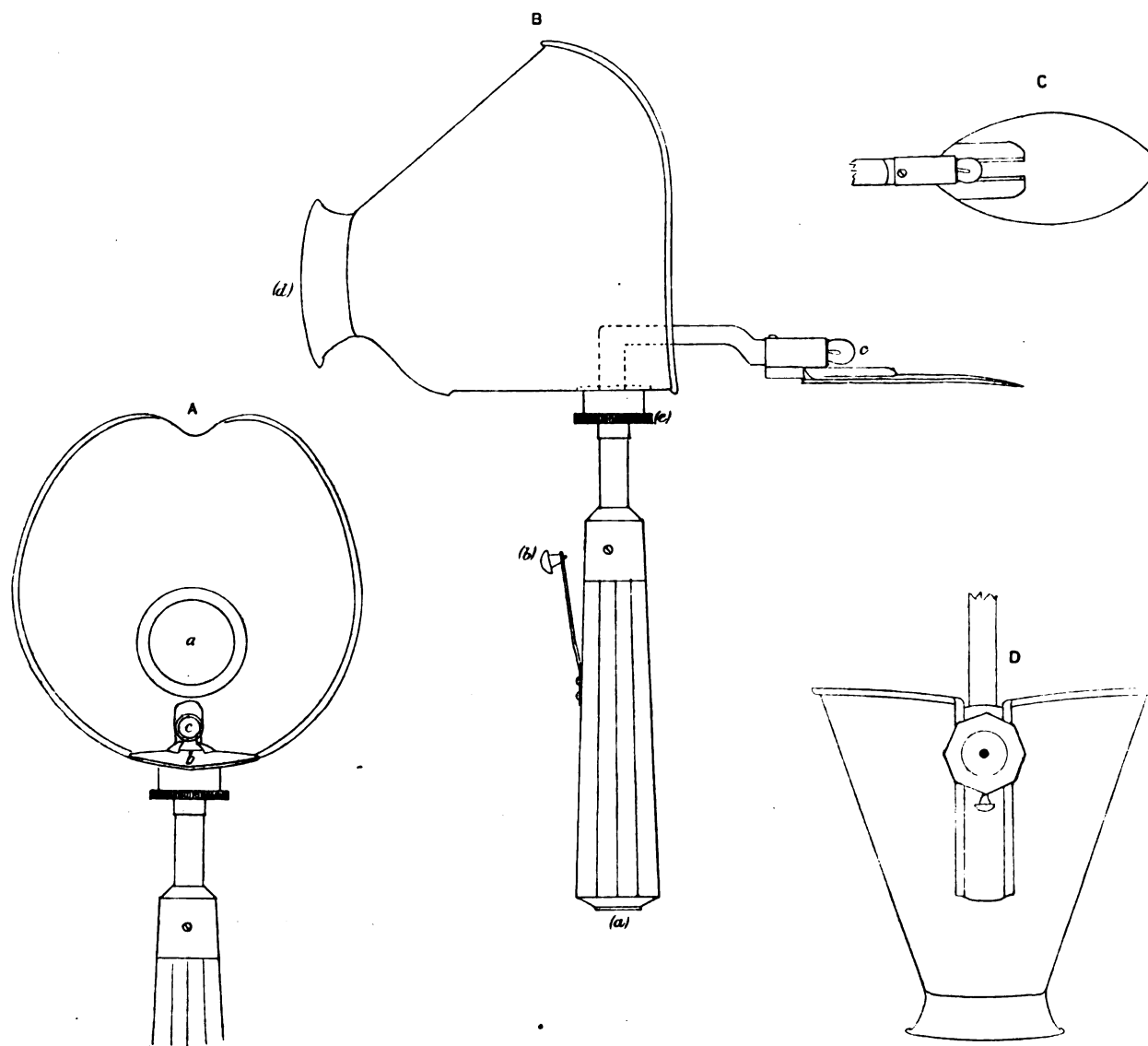
TO THE EDITORS OF THE "JOURNAL OF TROPICAL MEDICINE."

SIRS,—I enclose an illustration of an instrument invented by myself, though not patented, for the examination of the throat by day or by night.

A gives the front view of the instrument, showing at (*a*) an opening of a circular form, fitted with a piece of plain glass, through which the fauces and palate, the mouth, pharynx, and upper part of the œsophagus,

D the face-piece also detached.

At *B* the detached parts, *C* and *D*, are to be seen connected and ready for use. At this point (*a*) is attached the wires of the battery which pass through an opening at the bottom of the stem when required for use; at (*b*) you press the button on to the stem and in contact with the latter a powerful little electric light is emitted at (*c*); while through the glass opening at (*d*) you view the parts of the patient's mouth, throat, and windpipe. The face-piece can be either



Invented by Major G. H. Fink, I.M.S., M.R.C.S.(Eng.), L.S.A.(Lond.), and the instrument made for him by Messrs. Down Bros., London.

as well as the epiglottis and larynx with vocal cords, may be clearly seen by day or by night. In the latter case an electric lamp at (*c*) illuminates these parts, while (*b*) depresses the tongue and so gives the surgeon a good view of the parts behind and below the root of the tongue. It protects the surgeon or physician while examining cases of infectious throats.

B gives a side view of the instrument.

C the tongue depressor detached, and can be lengthened or shortened.

fixed firmly at the point (*e*) by the revolving disc, or it can be moved freely to any direction you desire to fix your examination upon. If you desire to obtain a clear view of the larynx and vocal cords you depress the stem, which also causes the tongue to be depressed by the tongue depressor, *C*. To obtain a magnified view of the parts you can attach either a magnifying glass at (*d*), or the binocular glasses properly focussed.

Yours, &c.,

G. H. FINK.

Notes and News.

THE Director of the Wellcome Physiological Research Laboratories desires to notify the medical profession that in consequence of the increasing demands upon the space available at these Laboratories in connection with physiological and bacteriological research and the production of therapeutic serums, *clinical diagnosis work in this Institution will be discontinued on and after December 11th, 1905.*

The clinical diagnosis work will be transferred to—Dr. E. C. Bousfield, The Camberwell Research Laboratory, 363, Old Kent Road, London, S.E.

MEDICAL CONGRESS AT LISBON, 1906.

Thursday, April 19, to Thursday, April 26.

THE Orient-Pacific Line beg to notify that they propose sending their fine twin-screw s.s. *Ophir*, 6,814 tons register, 10,000 horse-power, to Lisbon, for this Congress.

The fare for the seventeen days' cruise (exclusive of shore excursions) will be from £15 15s. upwards, according to the position of cabin occupied.

Plan of the steamer and further particulars will be sent on application.

Managers: F. Green and Co., Anderson, Anderson and Co. Head Office: Fenchurch Avenue, London. For passage apply to the latter firm at 5, Fenchurch Avenue, E.C., or to West End branch office, 28, Cockspur Street, S.W.

PROGRAMME OF CRUISE BY THE "OPHIR."

Thursday, April 12th, 2 p.m., leave Tilbury.

Friday morning, call at Cherbourg to embark Continental passengers.

Sunday, 15th, at Vigo.

Tuesday, 17th, at Tangier and Gibraltar.

The principal places of interest ashore will be visited.

Wednesday, 18th, 6 p.m., arrive Lisbon. During the stay of six days at Lisbon various excursions will be made, including visits to Madrid, Toledo, and the Escorial.

Tuesday, 24th, 6 p.m., leave Lisbon. Passengers who wish can leave at 4 p.m. next day, Wednesday, and rejoin the *Ophir* by train at Leixoes.

Wednesday, 25th, at Leixoes (for Oporto). The day will be spent ashore visiting the principal sights.

Saturday, 28th, call at Cherbourg to land Continental passengers.

Sunday, April 29th, 8 a.m., arrive back at Tilbury.

Plague.

India.—During the weeks ended November 25th, and December 2nd, the deaths from plague numbered 2,836 and 2,890.

South Africa.—No case of plague during the weeks ended November 25th and December 2nd and 9th in Cape Colony.

Mauritius.—During weeks ended December 14th, 21st, and 28th, fresh cases of plague numbered 8, 5, and 2; deaths from the disease, 7, 3, and 2.

Hong Kong.—During the week ended December 23rd, fresh cases, 3; deaths from the disease, 3.

New Drugs.

THE pharmaceutical preparations of Messrs. P. Beiersdorf & Co., of Hamburg, have long been renowned for their purity and excellence. The readers of the JOURNAL OF TROPICAL MEDICINE will be interested to learn that this firm achieved great distinction at the "Exposition Universelle," held at Liège in 1905, they having gained the highest possible award, the Grand Prix, for their pharmaceutical specialities.

We congratulate Messrs. P. Beiersdorf & Co. on this signal triumph, which is the more significant, inasmuch as their products were the *only* ones of German manufacture to gain the highest award, the Grand Prix, at the Liège Exhibition.

"ERNUTIN." A new product presenting the active therapeutic principle of Ergot.

"Ernutin" is issued in hermetically sealed phials, and being sterile is eminently suitable for hypodermic or intramuscular injection. When it is desired to obtain an immediate effect, as in *post-partum* hæmorrhage, intramuscular injection is to be preferred.

As "Ernutin" is a very potent preparation, its administration must be carefully guarded, and the dosage regulated accordingly. It is suggested that the initial dose be five minims, and that any subsequent dose required should depend upon the ascertained reaction of the patient.

BURROUGHS WELLCOME AND CO.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"New York Med. Journ.," September 23, 1905.

MALARIA. LECTURES ON THE DISEASES OF THE BLOOD. By JOHN M. SWAN, M.D.

"Riforma Medica," August 5, 1905.

SIGNORELLI, A. DISTURBANCES OF CUTANEOUS SENSIBILITY OF TUMOURS OF THE SPLEEN AND IN SPLENOPATHIES IN GENERAL. THE SPLENIC AREA.

Signorelli states that (a) "the splenic area" for clinical purposes is in the fifth intercostal space along the mammary line; (b) the "posterior splenic area" corresponds to the fifth, sixth, seventh, and eighth spinous process of the dorsal region; (c) "the lateral splenic area" exists in the intercostal spaces in the left mid-axillary line. These regions become sensitive in splenic derangements due to tumours or enlargement of the spleen. Corresponding areas of sensitiveness may occur on the right side by diffusion in exactly corresponding points to those described on the left side.

Original Communications.

FIT AND UNFIT PERSONS FOR RESIDENCE
IN WARM CLIMATES.

By W. HARTIGAN, M.D., D.P.H.

It has occurred to me that a few notes, embodying the results of experience gained during many years' residence in the Far East, might be interesting and useful to those who, by necessity or inclination, are induced to make their homes and seek employment in tropical and sub tropical regions. This must be my excuse for the following article, which makes no pretence to be a learned disquisition on climatology, but is simply a series of practical hints from a practising physician.

Whilst living in China I had often noticed how many more or less delicate men had been advised "to go out East, as they would be sure to improve," and now, when examining in London for various Far Eastern firms, I have frequently to reject applicants as "unfit" who had likewise been told that "they ought not to remain in England, but would get on capitally in China, or Burmah, or Peru, as the case might be." Such advice has usually not been given by those who have had tropical experience, or made a special study of epidemiology, but by the generally well-informed, thoroughly practical family doctor, in whose ken any distant clime, with a bright sun and tropical foliage, where an open-air life can be enjoyed, is just the place for the boy whose "lungs are slightly touched," or whose delicate physique unfits him for the rough-and-tumble of the football field, or who cannot bear the hardships of school life. This fallacy frequently gives rise to disappointment, and occasionally leads to disaster. It is true that exceptionally fine physique, great muscular development, or exuberant energy, are not necessary for healthy life in the Tropics. In my experience, wiry men, of medium height and slight build, even though a little under weight, of an active disposition, but not nervous temperament, do quite as well when transplanted to the East as the herculean gladiator of the playing fields or the madly enthusiastic gymnast. These latter (certainly when engaged in office work) seem to give way more to tropical *ennui*, become lazy, go in for verandah-life in a long chair, plus a whisky-and-soda, lose their energy, give up games and exercise, and soon "run to blubber." The nerve tone of the big man seems to be pitched in a lower key than that of his weaker brother, as if Nature would not pour out all her gifts on one subject, and balances the want of showy, physical attributes, by the gift of greater physiological resisting power against enervating climatic influences.

The great tropical explorers—Livingstone, Stanley, Emin, Johnston—men of superabundant grit and energy, were none of them giants, whilst it is an open secret that Lords Wolseley and Roberts, who have faced death and disease in every clime, would not "come up" to the present physical standard of an Army medical board. Careful discrimination must, however, be exercised. The weedy, narrow-chested, undersized, anæmic applicant, with thin, sandy or fair

hair, pale pinched features, too clear or high-coloured complexion; and likewise the gawky, undeveloped, lanky skeleton, with straight, lustreless, dark hair, probably bright eyes, but sallow, jaundiced features; or again the physically well-built, middle-sized man, uncertain and slow of speech, with a dull heavy expression, and face of unhealthy colourless hue, phlegmatic, except when he enlarges on the state of his own health; are all equally unsuited for the Tropics. The former become early victims of tropical anæmia, with its consequences, loss of energy and inability to work, and readily succumb to prevalent intestinal diseases; whilst the latter develop into chronic dyspeptics, with a morbid tendency to introspection and dislike of companionship, which too frequently leads to secret tipping.

Another type to be avoided is the over-strung, exuberantly active, good-all-round, "admirable Crichton," who burns the candle at both ends, dragging through his long office hours with good grace enough, doing his work fairly well—for he has brains—but perhaps not very thoroughly, spending his evenings in theatricals or dancing, enjoying his little dinners and suppers, taking or giving "a peg" or liqueur at every opportunity; he has exhausted his reserves, and whilst he may get along happily enough in a temperate climate, will, should he go to the Tropics, almost inevitably become "jumpy" and hysterical, subsequently physically weaker, with progressive loss of weight, followed by loss of interest (if it ever existed) in work, incapability of concentrated application, degenerating into a childish state of "don't care"; in short, he has generally "gone to pieces" without any very definite reasons therefor. This condition is usually combated by frequent "nips," forenoon "cock-tails," and early morning "night-caps," eventually culminating in that well-known euphemism, "tropical neurasthenia," or "climatic dyspeptic gastritis," more correctly known as "chronic alcoholism," vulgarly "drink"; finally eventuating in "a passage home," with a polite intimation of "services being no longer required."

A tropical climate does undoubtedly "get on the nerves," but it is usually ably assisted by "Scotch," "Irish," or "Cognac," good, bad, and indifferent; nevertheless, the man of nervous temperament is not a good subject for the Tropics, whilst the victim of any of the neuroses is generally unfit for work or residence in hot climates. Asthma may probably be excluded from this generalisation, as supposing the asthmatic to have the power of selection, he may find a suitable place wherein he will enjoy almost complete immunity, but in the absence of such choice the Tropics and Sub-Tropics should be avoided. This prohibition applies also to the epileptic, even if only suffering from "petit mal."

Likewise the man of bibulous habits is most unsuitable; his thirst is certain to be aggravated, whilst the amount of liquor consumed with comparative impunity in Britain becomes a potent nerve-poison in the Tropics. He who has once been the victim of alcoholism, even if apparently cured, should never return to the East, the old temptation will grow with opportunity, an increased inclination will overcome an enfeebled resistance, "and the dog is returned to his own vomit again."

The slave of the pipe too, with blackened, carious teeth, irregular heart's action, short of wind; and the cigarette fiend, whose congested throat, dried, furred tongue and watery eye proclaim the chronic dyspeptic, will not improve in a land where cigars can be had for a few cents, and smoking is permitted and encouraged everywhere and anywhere. In moderation the fragrant weed is soothing and harmless, but when a pocketful of cigars can be smoked between early breakfast and tiffin, and the chimney is then kept going till bedtime, the result is a shaky, nervous individual, frightened at his own shadow, seeing fatal illness in every trifling ailment, imagining those he has not got, incapable of exertion, or breaking into profuse perspiration on making the most ordinary effort, unable to make up his mind on any subject, droning into unsympathetic ears his personal or business worries, who finally "goes smash," financially and morally, or goes home. This is not a fancy picture. I have seen it; *ergo* "*cave canem*." For such, "better fifty years of Europe than a cycle of Cathay."

To return to the point whence I started, in my experience the man whose lungs—to use the popular expression—are merely weak, has generally on his first arrival in the more healthy Tropics improved, particularly if he has previously enjoyed fairly good health; but should he unfortunately be attacked by malaria, dysentery, sprue, or other debilitating disease, which, however, he is not especially liable, the weak spot is sure to be found out and pulmonary disease follow.

If, however, there exists latent pulmonary disease, by which I mean a previous lesion at the moment quiescent, the damp tropical heat and super-saturated air, even in the absence of other illness, will almost inevitably cause a recrudescence of active disease in the impaired lung, which will rapidly break down under continued exposure to its unhealthy and debilitating surroundings; whilst, if foci of active disease are already present, evidenced by a general infection or enlarging cavities, the subsequent course is most rapid, either the cavities pour forth pints of stinking pus swarming with bacteria, or, the lungs rapidly solidifying, breathing becomes most laboured, expectoration, which may not be at all profuse, is full of tubercle bacilli, then high temperatures and exhausting perspirations, frequently followed by severe and repeated hæmorrhages, ensue; these rapidly wear out the patient, and death ends the scene in a few weeks.

We have all seen the girl, previously in apparently good health, with perhaps too high a colour, who, you are, told "has caught cold." You take a grave view of the case, but are not believed. In a few days her downward progress puts a melancholy end to the scepticism and incredulity of family and friends.

Or perhaps the athletic young man, often a Scandinavian or Dane, who knows he has had some slight lung trouble, tells you he has spat up a little blood which he thinks has come from the throat, and brings some blood-tinged, scarcely viscid sputum, in which tubercle bacilli abound. You recommend prompt departure for healthier climes; he does not or cannot take your advice; rapidly recurring hæmorrhages follow. He at last gets away, the hæmoptysis is checked, but irreparable mischief has been done, and

he, too, succumbs, a victim of the too exuberant growth of the tropical forcing-house and of the mistaken advice which preferred "the nice warm climate" to his native northern snows. Sensible precaution can minimise the ill-effects of cold, which in many ways is most beneficial, but the deleterious qualities of damp heat are impossible to eliminate.

Although in my opinion *continued* residence in most parts of the Europeanised Far East is very detrimental to those phthisically inclined, the conditions obtaining in Hong Kong, Amoy, &c., during winter, and in Shanghai and Northern ports in spring and early autumn, may be actually favourable to them, whilst Chefoo and Wei-hai-wei are, even in summer, fairly good. Peking, Tientsin, &c., being drier, are less objectionable (as all-the-year-round residences) than the South China stations, but the dust is a great disadvantage.

Japan, likewise, though better than South China or the Straits, cannot be recommended. Its climate is variable and damp; even the hill resorts, though ideal at certain seasons, are injurious for other and longer periods.

Manila, called in some geography books "a sanitarium," is also unsuitable. Damp and great dry heat alternate, the climate is most relaxing, intestinal complaints are prevalent, cholera epidemics far too frequent. Singapore, Penang, the Malay States, Burmah, Java, Seychelles, Mauritius, &c., are all objectionable, though some have hill resorts where the conditions are decidedly more favourable, but one must always remember that the man who is earning his living can very rarely take advantage of them, whilst the man of means will go to Egypt, or Davos, or California, where good air, comfort, and life-giving amusements all contribute to renewed health and vitality. I have purposely excluded the Riviera, having found its climate lowering, treacherous, and changeable, many of its popular resorts insanitary (in flies and smells they could favourably compete with "Eastern bazaars," or "China towns"), whilst, when the mistral blows, the dust is most irritating to delicate throats and bronchi: the sun and sky give them their only advantage over our cloudy land.

The man whose first object is "to get a living," and who can only afterwards indulge in the endeavour to keep alive, should seek an open-air life in Colorado, Arizona, or parts of South Africa, Australia, or New Zealand, &c. If he must dwell in cities, Sydney, San Francisco, Cape Town, &c., will afford him fair opportunities with comparative safety, but let him keep away from Eastern towns. With care, he would have as good chances of prolonged life at home.

In conclusion, I would say that the healthy, steady man, of slight physique, active habits and cheerful disposition, not necessarily a tectotaller, but temperate in all things, who recognises his duty to work as well as the necessity of play, need have no hesitation, should the glamour of the East allure him, in seeking "fortunes, buffets, and rewards," "at the quiet limit of the world," or in following a vocation which called him to labour in tropical vineyards. Of such it may not be said that "the eyes of a fool are in the ends of the earth," always remembering *in medio tutissimus ibis*.

THE QUESTION OF THE MODE OF INFECTION IN MALTA FEVER.

By EDWARD H. ROSS, M.R.C.S., L.R.C.P.

Medical Officer, Sanitary Department, Port Said, Egypt.

MALTA fever has been the subject of some considerable attention during the past few years on account of its ravages amongst the *personnel* of the British Army and Navy stationed in the island of Malta. Malta is the headquarters of the Mediterranean Fleet and possesses a large military and naval garrison with a total numerical strength of nearly 30,000 men. Amongst these Malta fever has had a fairly constant annual incidence of nearly 700. Owing to the prolonged nature of the disease a majority of the cases have had to be invalided home to England, and thus their services have been temporarily lost to the Empire. This disease, therefore, has been the cause of the expenditure of much of the public money and a notable reduction in the efficiency of our available fighting forces in the Mediterranean. In addition to this the people of Malta suffer greatly from Malta fever, which gives the island a bad name, keeping away visitors, and interfering with its commerce.

Malta, however, is not the only place where the disease is prevalent, for its existence has now been demonstrated in several of the seaports of the Mediterranean, the Philippine Islands, Hong Kong, &c. The name Malta fever, therefore, is hardly fair to Malta, nor that of Mediterranean fever to the Mediterranean; but the disease is now so well known by these names that a new one would be inconvenient and confusing.

Malta fever, then, may be defined as a prolonged fever which may be either continuous, remittent or even intermittent in type, usually exhibiting waves, undulations, or cycles of severity, and accompanied almost invariably by enlargement of the spleen, profuse sweating, and certain complications. It is caused by the *Micrococcus melitensis* of Bruce, which is found in the blood and blood-forming organs of men and animals suffering from the disease.

The waves of fever continue in the majority of cases for two or three months, but the disease occasionally aborts in two or three weeks, or it may continue for more than a year with apyrexial intervals. The mortality is low; in most years it is less than 3 per cent. The diagnosis of Malta fever does not, as a rule, present much difficulty; the prolonged nature of the fever, the accompanying sweating, the complications of synovitis, neuritis, and the persistent anæmia, in addition to the fact that the disease is only endemic in certain sub-tropical towns, renders the clinical diagnosis an easy matter. In a person living in Malta, or who has recently resided in Malta, who has fever which continues for two or three months, who complains of little but malaise, headache, pains in the limbs and joints, and who exhibits no physical signs save those of fever and enlargement of the spleen, and who has never shown the ordinary signs of typhoid, the disease is almost certain to be Malta fever. But in addition to the clinical aspect of the case the knowledge that the *Micrococcus melitensis* will agglutinate in the presence of immune serum is

of great service. This serum reaction is fairly constant in its results and is of the greatest value as a confirmatory test in diagnosis. But it is not without its fallacies, for one occasionally finds variations in the agglutinating capabilities of apparently identical strains of the micrococcus, and thus confusing results are sometimes obtained.

The most conclusive means of diagnosis lies in the separation of the micrococcus from the blood of the patient; but this is not always practicable, and the fact that it could not always be carried out has diminished the value of much of the experimental work done. When obtained from the blood or elsewhere the identity of the micrococcus may be tested by its agglutination with immune blood serum, inoculation into susceptible animals and its subsequent recovery from them, its reaction to litmus, and negative Gram staining. Unfortunately it has not been in the power of many of us who have been investigating this disease to carry out all these confirmatory tests, so that the results of our experiments cannot be regarded as conclusive as might have been wished. But as a rule, save in exceptional cases, the diagnosis is easy and the work done must be valued accordingly.

There is no known specific cure for Malta fever, and up to the present time, according to the literature, not very much work has been done to obtain an antitoxin or a prophylactic serum for it; therefore it is necessary to find out how the disease is conveyed from one person to another in order to be able to take measures for its prevention. Having this object in view, Surgeon G. M. Levick, R.N., and myself undertook to investigate the disease by observation and experiment. After observing many cases of the disease from an epidemiological standpoint, we noted the following factors, and on these factors or postulates we based our experiments.

Postulate 1.—Malta fever is only prevalent in the towns near the coast of sub-tropical seas.

The only exception to this rule that we have, up to the present time, any reason to consider is the occurrence of Malta fever in Cairo. In this place the disease is said to exist, but beyond the statement to that effect we have but little proof of it at present. Judging by the only obtainable statistical returns, namely, those of the Army Medical Service, one finds that in the report for 1898, 191 cases of Malta fever occurred in the British garrison in Cairo; while in the reports for 1901 and 1902, when better methods of diagnosis had been instituted, and the disease better differentiated, the number of cases which occurred in the garrison fell to 7 and 4 for the two years respectively; so that in the space of four years, and with the same numerical strength of troops—namely, 5,000, the incidence of the disease had diminished from 191 to 4; while in the contiguous ports of Port Said and Alexandria the disease had increased. The inference is that the existence of endemic Malta fever in Cairo is at present non-proven.

With this exception, then, so far as we have been able to find out, Malta fever is confined to seaport towns in the Mediterranean, in the Philippine Islands, Hong Kong, Cuba, and Bermuda, its existence in the last two places, as in India, being still doubtful.

So far as the Mediterranean is concerned the distribution is peculiar, for it is confined to the southern and eastern shores. Having visited many of its ports during the past eighteen months, we have enquired into the prevalence of the disease in each, with the following results: In some places cases of prolonged fever were examined by us clinically, and tested with the serum reaction, and were found to be cases of true Mediterranean fever—Corfu, Beirut, Port Said, Malta. At the following places the disease has been identified by the local medical men, and tested by them with the serum reaction, and found to be prevalent: Tunis, Algiers, Athens, Alexandria. At the following places prolonged fevers are endemic, but we have been unable to find out if they have been definitely proved to be Malta fever or not: Smyrna, Constantinople, the Island of Lemnos, Oran. At Gibraltar, Malta fever was very prevalent two years ago, but from all accounts the disease has now almost disappeared, although at Algeciras it is still believed to exist.

On the northern shore of the Mediterranean the disease, if it exists at all, is very slightly prevalent; but we have not been able to obtain much information. At Toulon, and on the Riviera, it is absent (Shaw); at Barcelona it is probably malaria; at Genoa it is absent; but we have been informed that Neapolitan and Sicilian fever is true Mediterranean. With the exception of the case of Cairo above mentioned, our enquiries have led us to believe that the disease does not spread inland. It does not exist at Ismailia (Pressat), nor at Suez (Creswell), whilst at Port Said and Alexandria it is very prevalent; also three years ago the disease was present in Gibraltar, and is now at Algeciras, but not in the neighbouring Rhodda Valley, and while prevalent in Naples it is absent from Rome; so that we concluded that the disease is in some way connected with the sea, and this has consequently influenced our work.

Postulate 2.—Malta fever exists in endemic places all the year round, but its incidence is enormously increased in the hot weather, namely, from April until November, during the Mediterranean dry season.

Postulate 3.—In Malta the disease is especially prevalent in the hospitals in which cases of the disease have been treated, but it is not specially confined to the fever wards. Doctors and nurses in these hospitals frequently contract the disease.

It is very common for patients admitted to the Naval Hospital at Malta with surgical, venereal, or other affections to contract Malta fever after a stay there of a few days; and so commonly does this occur that it is sometimes necessary to question the advisability of sending patients to this hospital during the summer months.

The disease is also very prevalent in the Civil and Military Hospitals in Malta and in one of the hospitals in Port Said. In addition to this, it had been remarked by many observers, and by no less an authority than Hughes, that attacks of the disease may be localised to certain houses and barracks, and even to individual rooms, and to certain beds in a room. This, and knowing the fact that the disease cannot be conveyed by direct contact or by clothing worn by a patient, is of the utmost importance. Then,

again, newly built houses and those near which building operations are going on, are specially prone to the disease.

Postulate 4.—Malta fever frequently occurs in epidemic form, the cases then invariably appearing one after another, not simultaneously, as if they were caused by a common means acting at the same moment. Examination of the recorded epidemics is very interesting in this respect, for those which occurred during the summer months show an interval of only one day between the cases, whilst in those which occurred during the cold weather this interval is often prolonged to three or four days.

Postulate 5.—Amongst the officers and men of the warships stationed in Malta the disease is, as mentioned before, very rife, but the manner in which these contract it is interesting. As a rule, when in Malta, these ships are moored in the harbours a short distance from the shore, which is steep-to; and amongst the crews of such ships the disease never occurs except in the case of men or officers who have recently spent the day or night on shore, or have a few days before returned from hospital. This fact we have verified by the most careful enquiries and observations. If, however, one of these ships goes into dry dock, or is moored alongside a wharf in Malta harbour during the summer, an epidemic of Malta fever almost invariably breaks out on board. The case has occurred when such a ship, having been in dock for some days, has then left Malta for a prolonged cruise, and a few days after leaving port an epidemic of Malta fever has occurred on board, one case appearing regularly after another with a one or two days' interval; and this has continued for two months, several of the cases then occurring amongst men who had not been out of the ships for weeks.

On these five epidemiological postulates we based our experiments, realising that infection in Malta fever is due in all probability to one definite and specific cause, which we determined, if possible, to find out, in order that prophylactic measures might at once be instituted.

This specific method of the transmission of the disease must therefore coincide with and account for all the above five postulates before it can be stated that the correct mode of infection has been discovered.

On my arrival in Malta in June, 1904, I associated myself with Surgeon Levick, R.N., and we agreed to start work at once.

The question then arose: Which would be the best method of working? We were then both surgeons in the Navy attached to different ships in the Mediterranean Fleet, and we knew that we should often be separated from one another, the ships rarely remaining in one port for any length of time, so that we could not experiment with monkeys or other animals; nor could we hope to make elaborate bacteriological analyses, for we were rarely at Malta, where, however, Dr. Zammit did his utmost for us; and we had no laboratories beyond the cabins in our respective ships. So we determined to repeat, so far as our circumstances would allow, the methods employed by Reed, Carroll, Lazear, and Agramonte for the discovery of the mode of transmission of

yellow fever, by endeavouring to obtain volunteers who with ourselves would be willing to undertake the experiments, to expose themselves to the probability of contracting the disease, and at the same time to live under such conditions as would reduce the possibility of error. Five others without hesitation at once volunteered to join us, so we determined to try upon ourselves every possible method of the transmission of the disease, and then by a process of exclusion eventually to hit upon the right mode of infection.

Up to the present time the *Micrococcus melitensis* has been found constantly in the blood of patients suffering from Malta fever, even in such a small quantity as 5 milligrammes of the peripheral blood, and it has been found to be excreted intermittently in the urine; so that the possible modes of infection in Malta fever as in other analagous diseases are as follows:—

- (a) By direct contact with Malta fever patients.
- (b) By the clothing which has been worn by Malta fever patients.
- (c) By urine-infected dust.
- (d) By urine-infected water or food.
- (e) By biting insects.
- (f) Transmission in some way from some intermediate host.

Our first care was to assure ourselves that we were not immune to the disease; but as none of us had had Malta fever, and none of us had spent many months in the Mediterranean, and none of us had ever had any serious illness, we concluded that we were, some of us at all events, capable of contracting it. In addition we have all from time to time been tested with the serum reaction and this has always given negative results.

At first we proposed to experiment with artificial cultures of the micrococcus, but after much deliberation we realised that the results so obtained could only be inconclusive, for Nature does not work with agar cultures; and it is difficult to believe that under any natural conditions could the micrococcus occur in such numbers, such a degree of concentration and freedom from contamination as it is found when planted out on agar in the laboratory. As we could not afford to try experiments when their results would be inconclusive, we postponed the use of cultures until every other method of the transmission of the disease had been tried and failed.

We therefore decided to imitate natural methods as far as possible and to avoid artificially prepared materials for our experiments. From the outset we encountered some difficulties, as might have been expected. Chief of these was that we were constantly being separated, so that instead of being able to carry out the experiment with all the non-immunes simultaneously, we, as a rule, had to be content with three or four, and therefore each experiment had to be repeated and its result confirmed. Then we experienced great difficulty in obtaining materials to experiment with. Thus we frequently wanted to examine several patients in the hope of discovering some fact which would throw some light on the problem before us, or we wished to obtain urine from a patient, especially when it was known to contain the micrococcus, or we

desired to allow recently hatched mosquitoes to bite a patient, who was willing that it should do so, in order that it might subsequently bite us, but we often encountered every conceivable opposition from those who had charge of such patients, and by those who are kept constantly acquainted with the ravages of the disease and apparently regard it in a state of lethargy from which it is impossible to wake them. Our work, therefore, is not as complete as it should have been had we been enabled to take advantage of every opportunity.

(a) We first considered the possibility of the transmission of Malta fever by direct contact. The possibility of this is remote, for although Malta fever is very prevalent in hospitals in Malta and other places where the disease is endemic, yet every year hundreds of men suffering from Malta fever are invalided to England and are treated in the naval and military hospitals at home, but the disease has never been known to spread in these latter hospitals; nor have nurses or orderlies ever been known to contract Malta fever at Haslar, Netley, Chatham, or Devonport. Nevertheless, as the opinion has been expressed that "One is driven to accept tentatively the unwelcome conclusion that Mediterranean fever is probably of a directly contagious nature" (Shaw), we attempted to reproduce the disease in the following way: A man suffering from Malta fever contracted in a Malta hospital was nursed in the ordinary sick-birth of a war-ship for a month by some non-immunes, who were in daily contact with the ship's company, but none of them contracted Malta fever.

This was repeated in another ship with another patient with the same result. Then on two separate occasions two non-immunes slept in the bedclothes which had been used by Malta fever patients, and still none of them contracted the disease.

This mode of infection does not agree with any of our postulates except possibly No. 3.

The conclusion is that the disease cannot be contracted in this way.

(b) Infection by clothing

Nightshirts which had been worn by Malta fever patients were conveyed on board four different ships and there slept in by four different non-immunes. They all remained well.

This mode of infection can only possibly agree with postulate 3; but it will not account for the increase of the disease during the hot weather nor its prevalence in ships which have recently been in dock. Then if the disease was transmitted by clothing or fomites it ought to spread in England; but it does not.

(c) Transmission by urine-infected dust.

In Malta, during the summer months, there is an almost complete absence of rainfall, and in consequence dust is blown about everywhere; in Malta, also, some of the people have an unpleasant habit of urinating in the streets, and therefore it seemed possible that the dust might become infected with the micrococcus excreted in the urine, and so passed from one man to another. It has been held that this is the chief means of the propagation of the disease.

We therefore mixed urine obtained from a Malta fever patient with some dust, and this was sniffed up the nostrils by two non-immunes, but they did not

contract the disease. This experiment was then repeated by four non-immunes, with the same result.

Unfortunately we were not in a position to demonstrate the presence of the coccus in the specimens of urine employed in these two tests; but as one of us had, previous to our determination, mixed a living culture with some dust and inhaled it without deleterious consequences, we did not repeat or continue dust experiments.

Infection by dust will not explain the prevalence of the disease in hospitals, nor epidemics on board ships when at sea. It is impossible to believe that a particle of infected dust should strike the nostrils of John Smith lying in Z Ward of the Naval Hospital at Malta, the remainder of the patients in that ward escaping, and another particle of urine-infected dust should strike the nostrils of William Jones lying in the same ward of the hospital three days later, and so on. Also ships at sea do not contain dust. This dust theory will not agree with postulates 3, 4 and 5.

(d) Infection by urine-infected water.

"The water-borne theory is on all sides considered improbable" (B. Smith). Epidemics do not follow the course of the water supplies in Malta. The incidence of the disease does not follow the course of that of typhoid. Hospitals are usually the last places to consume polluted water, and on board the ships of the Navy the water is distilled when at sea.

Infection by drinking water will not agree with postulates 3, 2, 4, and 5; but to make sure we mixed urine from a Malta fever patient with some water, and this was drunk by six non-immunes and none of them contracted Malta fever.

We made no experiments with food apart from water, except that four non-immunes drank some goat's milk which contained diluted urine in which the micrococcus was present, and they all remained well.

(e) Infection by biting insects.

I have stated elsewhere the opinion that this is the common and specific mode of infection in Malta fever, and up to the present time have met with no reason to alter that opinion.

Of all the methods of infection this seems to be the most probable one. It is the only one which will agree with all our postulates.

(1) The disease is endemic only in certain places; then it is probably conveyed by some insect which only inhabits these certain places.

(2) Malta fever occurs in the endemic areas all the year round, but its incidence is enormously increased during the summer months; some mosquitoes and biting flies live and bite in these endemic areas all the year round, but all biting insects increase enormously during the hot weather.

(3) Malta fever is specially prevalent in the hospitals where cases of the disease are being treated. When we know that it is not directly contagious and cannot be conveyed by infected clothing the insect-borne theory will alone explain the marked prevalence the disease has in hospitals and among nurses and orderlies in them. In hospitals, of all places, water and milk should be carefully sterilised and food carefully prepared.

Then the predilection Malta fever has for certain houses, rooms, and even beds, can only, in the absence

of the conveyance of the disease by direct contact, or by clothing, be explained by the insect-borne theory. These last factors favour the transmission being by mosquitoes rather than by flies, for a mosquito will remain in the same room of a house or ship for months, so long as it can obtain a sufficiency of food in it.

(4) Then, again, during epidemics persons commonly contract the disease one after another in the hot weather, the interval between the cases being then short, for the mosquitoes feed regularly; but this interval is increased to two, three, or more days when the weather is cold, and when the digestive periods of insects is prolonged during partial hibernation. Mosquitoes rarely fly off to the men-of-war in Malta harbours, but if a ship goes into dock then she is at once invaded by these pests and an epidemic occurs. Sometimes when such a ship goes to sea the epidemic continues because the insect remains on board conveying the disease from one person to another with a regular interval corresponding with its digestive period.

(5) Then amongst the crews of the men-of-war which have not recently been in dock the disease does not occur except in the case of men or officers who have been on shore a few days before. Every one on board necessarily consumes the same food and water, and fresh milk is never obtained by the men, so that this means of transmission by food and water seems improbable, and men must become infected by insects when on shore. The British sailor does not, as a rule, when he goes on shore at night on the spree, drink MILK.

We have experimented with many kinds of biting insects by making them imbibe the blood of patients suffering from Malta fever, and then allowing them to bite as many non-immunes as it was possible to arrange; but owing to the fact that we were living on board ship we had often the greatest difficulty in keeping the insects alive and making them bite regularly. In the case of *Acartomyia zammitii*, a mosquito which passes its larval stages in concentrated sea-water, which we have found in every place in the Mediterranean where Malta fever is known to be endemic, and which we in confidence thought to be instrumental in conveying the disease, we have been quite unable to make it bite regularly or to live long enough, with the means at our disposal, to give conclusive results. Had we been able to let loose in a mosquito-proof room a few infected mosquitoes of various species, and then been able to sleep in that room one by one, I am sure that we should have all of us contracted the disease, and its means of transmission been proved. Nevertheless, we did succeed in experimenting with some of the common species—namely, *Culex pipiens*, *Culex fatigans*, *Stegomyia fasciata*, and with fleas and bugs, but we did not apparently hit upon the right insect, for none of us contracted the disease.

Apart from this, very little work has been done upon this mode of infection in Malta fever. The Mediterranean Fever Commission has, it is true, made some experiments with *Stegomyia fasciata*, but so far as I am aware no other species of mosquito or kind of insect has yet been tried. Zammit claims to have succeeded in transmitting the disease from one monkey

to another by *Stegomyia fasciata*, but he has been unable to confirm this result, and our experiments with this species have failed.

Apart from these experiments this mode of infection has been ignored, so that there still remains a great deal of work to be done before it can be said that this mode of infection can be excluded. Some arguments have been adduced against it, but they may be readily dismissed. The argument that because typhoid is not insect-borne Malta fever cannot be is not reasonable. It has been stated that the *Micrococcus melitensis* has not been discovered in sufficient quantities in the peripheral blood to render it possible for insects to infect themselves by biting Malta fever patients. This argument was made much of three years ago before the micrococcus had been discovered in the peripheral blood. It was repeated after it had been discovered in the peripheral blood. It was again repeated after it had been demonstrated in 1 cc. of blood. It was again repeated after it had been separated from 0.0005 cc. of blood. Perhaps it will be again repeated when it has been found in 1 milligramme of blood. It seems probable that the zenith of bacteriological method has not yet been arrived at.

Then it has been stated, "No known disease of bacterial origin (as contrasted with those of protozoal origin) has yet been proved to be insect-borne." Have we, then, so fathomed the depths of Nature's methods that we can afford to dismiss a possibility like this on the strength of a negative analogy?

The Mediterranean Fever Commission has produced the disease in monkeys in a variety of ways. These monkeys were kept chained to cages placed close together on an open stone causeway at the Public Health Laboratory at Malta.

Dust which had been mixed with the whole contents of three, four, or more agar cultures was blown into a monkey's cage periodically from July 10th until August 26th, and it was not until the latter date that the monkey showed signs of Malta fever. This was repeated in another monkey, only the dust in this case was blown up its nostrils. This was continued almost daily for a month before the monkey contracted the disease. Some monkeys were fed daily on whole agar cultures for more than a month before their blood reacted. These monkeys required, on the average, to be given the growths on twenty-seven agar slopes before they contracted Malta fever. These animals are always gnawing at their chains or the bars of their cages, and during the dust experiment had to be gagged, so that it is difficult to exclude the possibility of infection through the sores and abrasions thus caused, and the same applies to experiments with goats.

It is impossible to believe that under any conditions in Nature could a man partake of the number of micrococci found on twenty-seven agar slopes. If the minutest quantity of a culture of the micrococcus is placed under the skin, the disease is invariably produced after an incubation period of about six days; whereas these monkeys had to be fed for weeks before they contracted the disease.

While these experiments were going on, two other monkeys which had not been the subjects of any experiment at all contracted Malta fever. Some

monkeys which had been the subjects of contact experiments also contracted it. Subsequently some other monkeys which had received injections of epidermal scrapings gave temporary reactions to Malta fever after varying intervals, but these were ascribed to the action of toxins, paddling about in infected urine, or to *Stegomyia*.

But is it not possible that these monkeys which contracted the disease "naturally," as Major Horrocks calls it, in reality contracted it in the only way in which it is commonly contracted, and the only way which has not been the subject of thorough experiment? One cannot help thinking that perhaps some of the monkeys which were the subjects of experiment also contracted the disease "naturally."

None of these monkeys were kept under mosquito-proof conditions, and consequently these experiments lose much of their value. We know that the disease does not spread by contact, or by clothing, or by the sweat, or by the breath, for if it did we should have Malta fever every summer in England; so that the inference is that some of these monkeys which were supposed to have contracted the disease by artificial means in reality contracted it naturally. Perhaps an infected insect was hovering in the neighbourhood of these monkeys, and it spread the disease from one to another, their infection not being the result of experiment at all.

We ourselves have swallowed reasonable quantities of the micrococci under conditions which precluded the possibility of insect infection and we all remain well to this day.

(f) Infection in some way from some intermediate host.

During the winter of 1904-1905 we were informed by Zammit that he had found goats to be susceptible to Malta fever, and he subsequently discovered that a large percentage of these animals in Malta were actually suffering from the disease which had been contracted naturally. As a result of this the *Micrococcus melitensis* was looked for in the milk of these animals and found in it. It was therefore at once concluded that the disease was transmitted from goats to man through the medium of the milk. This discovery was published broadcast and the matter was, by some, considered finished, for it was supposed that the goats contracted the disease by eating offal in the streets. But it was then discovered by Zammit and Shaw that cows also were susceptible to Malta fever, and that some of the cows in Malta had also contracted the disease naturally. It was then suggested that cows also sometimes eat offal.

We were all very much struck by these discoveries, and in consequence I at once wrote to the Medical Superintendent of a hospital in which several cases of Malta fever had been contracted and in which the disease was actually prevalent at the time, asking him to put these discoveries to the test by carefully sterilising all the milk supplied to his hospital and to watch results.

This he did on receipt of my letter (August). Milk had always been carefully sterilised in his hospital, but he made doubly sure of it by superintending the sterilisation of it himself. The result was that not only did the disease continue to occur, but he himself,

alone of his household, having always disdained the use of mosquito netting, first contracted benign tertian malaria and then a severe attack of Malta fever, from which he is still suffering.

In the meantime, on our return to Malta we determined to try the effect of drinking naturally infected goat's milk on as many non-immunes as it was possible to collect together in the short time we had at our disposal (seven days), but we were very disappointed to find that we could not obtain the milk in which the presence of the micrococcus had been demonstrated, so we had to be satisfied with the following test. We mixed a large loopful of a living culture of the micrococcus with some goat's milk, which, after keeping a few hours, was drunk by four non-immunes. One of these kept the milk too long, for after drinking it he had an attack of vomiting, but the others retained it well. To our astonishment nothing occurred, all the non-immunes remaining well; but we realised that at the best this experiment was artificial as we had used an artificial culture, but we were quite unable to obtain naturally infected milk. When we considered, however, the results of this and our former experiments and that all epidemiological factors point most strongly to the disease being insect-borne and against infection by the alimentary canal, we sought an explanation of the disease occurring alike amongst men, goats and cows under the insect-borne theory. We therefore debated the possibility of Malta fever not being conveyed by milk or the eating of offal, but by insects which transmitted the disease to all these animals. If this was the case, then one would expect that some other animal which did not under any conditions eat offal or drink milk, and which lived in Malta, would also commonly suffer from the disease.

I, therefore, being away from Malta at the time, wrote to Dr. P. Micallef, of the Public Health Department in that Island, asking him to examine the bloods of as many horses as possible to see if any of them reacted to Malta fever.

This he did at once. He has examined up to the present the bloods of thirty-eight horses of which four reacted to Malta fever. As one cannot accuse horses of eating offal in the streets or of drinking goat's milk, and taking into consideration our experiments and the epidemiological factors herein set down, one must conclude that although the micrococcus is present in goat's milk and is excreted in the urine of men and animals suffering from the disease, yet it is in all probability not conveyed by the drinking of milk or the eating of offal, but by an insect, as yet undiscovered, which transmits it from person to person, goat to goat, cow to cow, and horse to horse, and possibly from one of these animals to the others.

Lastly, from the epidemiological factors and the experimental work done, the possibility of the disease being conveyed by dust, water, food, or direct contact seems highly improbable.

It behoves us all, therefore, who are in daily contact with the disease, or who are interested in it and are able to do so, to search diligently for the mosquito, biting fly, or other insect which conveys it, and when found to institute means for its extermination.

THE MOSQUITO WORMS OF TRINIDAD AND THEIR REAL NATURE.

By A. J. B. DUPREY, M.R.C.S., L.R.C.P.

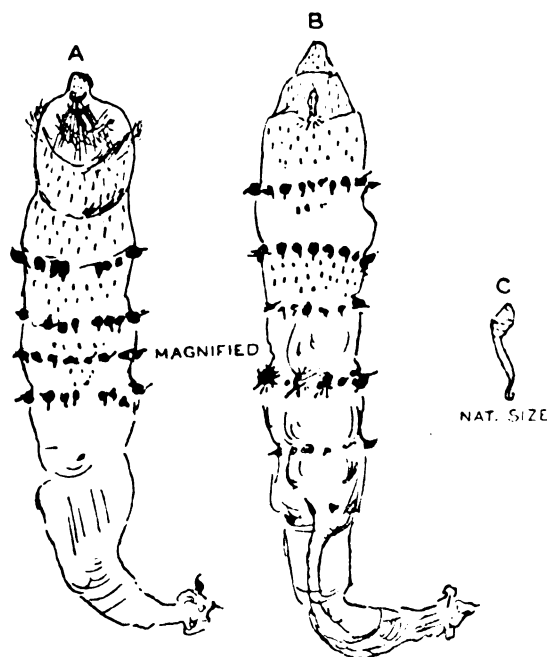
Mayaro, Trinidad, West Indies.

IN Trinidad, more than any of the other West Indian Islands, cases of external myiasis are not of infrequent occurrence. This is especially the case in this district, where the presence of various parasitic diseases is mostly due to the extensive tracts of purely virgin forests in an, as yet, uncultivated part of the country, and in which abound all kinds of biting and venomous animals. The traveller in these forests will experience very great annoyance through a myriad of flies and other insects of all sorts and sizes, some even beautiful and glittering in their varied colourings of blue and green, keeping up a continuous buzzing for miles of forests through which the wayfarer travels. Fortunately for man, who is well able to defend himself, these flies, with the exception perhaps of the undaunted mosquitoes, do not often attack him; but the poor animal which he bestrides is not infrequently blooded to a considerable extent. Often the hunter or the planter, after his bush excursions, finds that he has been bitten, as he thinks, by mosquitoes, which fact in itself is not at all surprising, but he discovers later that there are four or more very irritable and bumpy spots about his body, usually on the hands and face, sometimes on his legs, for which he cannot account. The experienced bushman knows these to be mosquito worms, and awaits patiently for a day or two, when the worms shall have matured, and forthwith takes the necessary steps to rid himself of them. The uninitiated, however, continues to rub the irritable spot until he finds that, instead of subsiding, a not inconsiderable blush of inflammation has spread around the original bump, where he may notice a small aperture about the size of a pin's head, from which exudes a sero-purulent discharge. A knowing one now sees this inflamed spot, and at once recognises the nature of the condition: he proceeds either to squeeze out the worm, or, if the part is very painful, he applies a little plaister over the aperture usually, among the labourers, made of brown paper coated over with a soft tallow. The worm being an air-breather soon dies, after which it can be readily squeezed out. On account of the knowledge and experience which the labourer has of quickly ridding himself of this worm a case is seldom allowed to go far enough to require the services of a medical man, so it comes about that the doctor rarely sees a case. I had the opportunity of seeing a very severe case of so-called mosquito worm infection a short time back, and as I had no idea of what a mosquito worm was I was naturally much interested in the case.

The patient had been out on an excursion in the woods for the greater part of the day, and, as a consequence, was infected in the lower third and outer aspect of his left thigh, where there was to be seen a round hole about the size of a No. 9 shot, from which pus exuded on slight pressure. The surrounding inflammation was fairly extensive and indurated, of a bright red colour, and acutely sensitive. The constitutional symptoms were severe: he had a thickly coated tongue, a febrile pulse, and really looked very

pale and ill. On the front of his leg on the same side there was an angry and weeping eczematous eruption, probably also of a parasitic nature of some kind, which easily subsided on treatment. A little 1 in 40 carbolic lotion syringed in the aperture quickly killed the worm, and on the following day, after the subsidence of the inflammation, the worm was extracted. This latter was not kept for my inspection, but the gentleman gave some description of its appearance which caused me to think it was the larva of the *Dermatobia nonialis*. An abscess developed in his thigh, which was opened a few days after by a doctor in Port of Spain.

Some weeks after another gentleman came to show me several little swellings on his face and hand, which he said were mosquito worms. There were no less than four on his chin, over one of which he had placed the proverbial plaister, and one on the back of his left hand. The swelling over which the plaister was placed was the size of a pea, and two small holes could be seen where entrances were effected. The bump was very painful on pressure, and the man said that the worms were not ready to be squeezed out, but that he would return on the morrow. The little swelling on his hand was a mere papule, in the centre of which was the minute aperture of entrance, very much like a mosquito bite (hence the name of mosquito worms). It was extremely irritable, and I noticed the man rubbed it continually. On the morning of the next day he came again, when I squeezed out two little worms from his chin quite close to one another, from the examination of which I made the following drawing.



Dermatobia nonialis "Mosquito Worms."

The larvæ belong to the genus *Dermatobia*, which are variously described by authors; the length and size vary considerably according to the stage of development. The larvæ are whitish in colour and club-shaped, the

handle-part of the club or posterior extremity being furnished with the respiratory apparatus. There is, I think, some mistake made with regard to the mode of infection. The larvæ are described as though the fly actually deposits her eggs directly in the skin of man, dogs, or wild animals. Scheube says "it mostly lays its eggs in the skin of cattle, sheep, and dogs, and sometimes in the skin of man"; and Manson, in his "Tropical Diseases" (1898 ed.), says the same. Daniels thinks "man as well as animals may be attacked." It may be said here that the fly never attacks man or animals directly, but that the eggs are deposited on leaves and branches in wooded lands and forests, and thus man, hunting dogs and other wild animals in passing through get the larvæ deposited on them accidentally. I believe this is evident from the fact that, though the affection is common in Trinidad, no one has as yet seen the fly or can tell in what way the worms get deposited on the skin. The presence of the *Dermatobia nonialis* is not even suspected, seeing that the worm is attributed to the bite of the mosquito. I am inclined to think, therefore, that the nature of the mosquito worms has never been recognised in Trinidad. I have never heard of the existence of the *Dermatobia* in the other British Islands of the West Indies.

IS MALTA FEVER PECULIAR TO MALTA?

By LLEWELLYN P. PHILLIPS, M.D., M.R.C.S., F.R.C.S.

Cairo, Egypt.

IN a leading article on this subject in the Journal of December 15th, you state that Malta fever is infrequent and rare elsewhere than in Malta. Now the following facts will show that it is far from rare in Egypt, the evidence for its occurrence not resting on clinical facts alone, but also on the agglutination test.

Cairo.—In Cairo this year five cases of Malta fever have been under my care, a short *résumé* of them being as follows:—

(1) A Coptic lady who lived in Cairo and who had not left it this year, called me in to see her in October; she had been ill for about three months with a fever which was constantly relapsing, and had been treated for malaria with no success. I suspected Malta fever, and had her blood examined by Dr. Dryer, the medical officer of health for Cairo; it was found to agglutinate the *Micrococcus melitensis*. She had a subsequent relapse, and still remains ill.

(2) Another Egyptian called me in a few days later, and told me that he had Malta fever. He lived some six houses away from the preceding case in the same street. He had been ill for about eight months. The original attack occurred in Cairo, but was not suspected. He then went down to Alexandria, where a relapse occurred. An agglutination test was then applied, and gave a positive result of 1 in 500. He then went after that to Vienna for the summer, and promptly had another relapse. Professor Nothnagel saw him there, and had a further blood examination made. This was positive in a dilution of 1 in 1,000. When I saw him he was in his sixth relapse, which

was of the undulant type, and proved to be the last. In December his blood was again examined and agglutinated the *Micrococcus melitensis* in a dilution of 1 in 300.

(3) A Berberin servant living in Cairo was admitted to Kasr el Ainy Hospital under me with what I at first diagnosed as rheumatic fever, there being pains and sweats; a systolic mitral murmur developed. He was put under salicylates and kept on them for ten days, but with no effect, so I stopped them; the temperature then ran up to 105°, but came down with cold sponging. I now had his blood examined, with the result that it agglutinated the micrococcus of Malta fever. Meanwhile I put him on liquor hydrargyri perchloridii in drachm doses, his temperature came down and remained down, and he slowly got well.

(4) A Cairo policeman was attending my out-patient department for some weeks with what was apparently chronic rheumatism. Two weeks running his temperature was 100°, so I had a blood examination made by Dr. Ferguson, with a positive result for Malta fever. He, however, refused to be admitted into hospital.

(5) This was the case of an Englishman who was employed in the Cairo police stores. It is particularly interesting, as he had a double infection with typhoid fever and Malta fever. I intend publishing the case in detail shortly.

He was taken ill in September with diarrhoea and fever, and in fact went through a severe attack of typhoid fever, with a positive Widal reaction. He was very delirious and nearly died. This was followed by a relapse of the same nature. After an interval of some twenty-five days again he had a relapse, with signs of bladder irritation. The fever did not, however, subside, but became remittent in type; he having served in Malta some years ago he said he thought he had "slow continued fever," which he said was common in Malta, but which he escaped there. I had a specimen of his blood tested by Dr. Dyer, with the result that it agglutinated the micrococcus of Malta fever. A second specimen a week later still agglutinated the *Micrococcus melitensis*, but no longer agglutinated the typhoid bacillus. I treated him with sodium thiosulphate, as suggested by Dr. Betts, and found useful by him at Port Said, but with no effect. I then gave him perchloride of mercury as in the former case, with excellent results. In fact, I believe that perchloride of mercury given whilst the fever is coming down at the end of a paroxysm and continued for some time, is very efficient in cutting short the disease.

Besides these cases which were under me, there were several others admitted to the Cairo Fever Hospital, in whom the nature of the disease was proved by the agglutination test.

In Port Said there has been quite an epidemic of the disease, the doctor of the Government Hospital himself contracting the disease. Whilst under my care for it at Cairo, he told me that he had treated about a hundred cases there during the last few years, many of them being confirmed by the agglutination test.

I therefore consider that the fact is undoubted that Malta fever occurs endemically in Egypt.

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THE Journal of Tropical Medicine

JANUARY 15, 1906.

A PLEA FOR UNIFORMITY AND GREATER OFFICIAL SUPPORT IN THE COL- LECTION OF COLONIAL CLIMATIC DATA.

METEOROLOGY is a science that, perhaps more than any other, is dependent on amateur effort; for the professional meteorologist is one of the rarest of the scientific fauna; a dozen or so sufficing for the needs of even a good-sized kingdom. Many of our colonies are absolutely unprovided with specialists in this branch of knowledge, the work being handed over to the astronomer, where such a scientific luxury is indulged in, or elsewhere to the medical authorities "in addition to their other duties"; and everywhere the rank and file of the official observers are furnished by the medical services.

Doubtless, by virtue of his scientific training, the medical officer is usually the best man avail-

able for the purpose; but against this may be put the fact that, like a woman's, a doctor's work is never done, so that he is liable to be called away at any time and so perforce neglect this less important item of his duties.

Now, to be of any real value with the customary equipment, meteorological observations must be taken punctually at stated times, and it would therefore be probably better if more usually engineering officials, who are less liable to irregular calls, were chosen for these duties.

As matters stand, the actual taking of the observations must necessarily be often deputed to native assistants; and the result is that personal observation becomes irregular, and the medical officer necessarily loses the personal and continuous interest in this branch of his duties, which alone can secure valid results.

During the writer's work in unearthing climatological data from official sources he met with the most ludicrous instances of this sort.

Observations at stated hours recorded as above the maximum or below the minimum of the same days; wildly impossible readings of the differences between the wet and dry bulb thermometers and deliberate fudging. In one case an entire year's observations were coolly copied, figure for figure, from a previous year. Of course such a case as this implies not only neglect of personal observation but an entire absence of any attempt at supervision. Such lapses are, however, far more excusable than at first sight appears.

The most exact and careful series of personal observations may be utterly spoiled by the advent of a baby or a surgical emergency, and practically the actual observation must often be left to a ward coolie or even a private servant, who at most can barely read.

Under such circumstances it is impossible for the work to be *well* done, however keen the medical officer may be; and no man can be fairly expected to take a genuine interest in any work unless he is so circumstanced as to be able to do it thoroughly.

Under these circumstances it is by no means surprising that one has to exercise considerable care in selecting observations, and must needs

often reject a large proportion of those recorded or purporting to be so.

In one case, indeed, a discriminating superintending medical officer refused to record an entire year's observations, as he had convinced himself that they were entirely valueless.

This condemnation was probably too sweeping, as the records were probably neither better nor worse than the average, and doubtless included many that could be picked out by an expert as sufficiently reliable for inclusion as components of averages; but it is obvious that the administrative officer could not take this course without exposing to reprimand overworked officers, excellent and energetic in their proper duties; and whom he knew under existing circumstances could not fairly be expected to take any genuine interest in this by-path of their work. To expect observations at stated hours from medical men of any class is to demand an impossibility, and the farce of attempting to do so should cease. When no other observer is available the observatories should be supplied only with self-recording instruments, which can be recorded and set at almost any time of the day.

Instead of this, however, the equipment of colonial observatories is of the most variable and often of a needlessly complicated sort. Moreover, even where observations taken at stated hours bear the impress of care and exactitude their value is greatly discounted by the fact that they are not uniformly taken at the same hour, even within the limits of a single colony; and are, therefore, useless for purposes of comparison, and after all the main value of all such observations is comparative.

The reason for this deplorable want of system and wasted labour and opportunity are not far to seek, and lie in the fact that, in spite of the enormous extent and value of our Colonial Empire, this rich country does not afford itself even a single specialist to collate and systematise the reports coming in from all parts of the world, on a subject which may, without exaggeration, be affirmed to afford some of the most indispensable data for all rational sanitary and economic progress. Without this knowledge the sanitarian

is unable to pronounce what measures promise best for the vulnerability of the parasites which cause most tropical maladies of man and beast, as these depend more than anything on the intelligent application of an accurate knowledge of the climatic peculiarities of a region — while on the economic side, who can say what sites are likely to be suitable for the growth of cotton and other crops, without accurate and systematic information on this vitally important subject.

Enormous sums have been and are being wasted on bootless experiments of this sort; while a tithe of the cost would suffice to equip and maintain an adequate colonial and central staff for the collection and publication of this most indispensable class of information; but just as our armies have had to blunder through unmapped areas of our own territory, so must those who would exploit the latest resources of our colonies blunder into unknown climates.

Let us hope that our new Liberal Government will show itself liberal in more than name in this matter, for it is humiliating to turn from the climatological returns of our own colonies to those of other governments, which usually show a much better claim to the title in the best interpretations of the word.

Science, however, in any form can expect little encouragement from any English government, but pending the unfortunately very unlikely consummation of money being spent on this most important and certainly remunerative object, something at least might be done in the direction of uniformity and in the simplification of the equipment of observing stations. With the exception of observatories at the seats of Government where a specially trained subordinate should be detailed for the work, in addition, perhaps, to clerical duties, all observatories working at stated hours should be done away with, at any rate, if they are to be conducted through the agency of the medical services. Barometric observations have but little interest to the climatologist, and are only useful for weather forecasts when combined with simultaneous telegraphic reporting over large areas; and such observations might very well be omitted from the ordinary sta-

tions, which should be equipped with only a rain gauge and maximum and minimum dry and wet bulb thermometers. Under this system five instruments only would have to be attended to *once a day*, and it would be a matter of no moment what hour of the day was selected for the purpose; nor, within very wide limits would it matter if the hours of observation were the same; though probably some time in the evening would be most convenient for the purpose, in which case the observations might be recorded at any time between 4 p.m. and midnight, at the observers' convenience.

A sixth column should be added to the form for a statement of the average amount of cloud, and in certain cases, perhaps, a sixth instrument might be added, in the shape of a wind vane.

The data suggested afford the maximum and minimum and range of temperature of the day definitely, while in the case of temperature the average of the maximum and minimum approaches so closely to the true mean temperature of the day that it is adopted as such in many countries. It also furnishes definitely the maximum and minimum relative humidity of the day, and the average of these, though constantly less than the true mean, is exactly comparable with the means of other stations where the same system is adopted.

It gives also the amount of rainfall and the number of rainy days, while the complement of the amount of cloud gives the proportion of insolation received at the station. The monthly and annual means derivable from these figures should be calculated at the station of observation, but it is better that the calculation of the relative humidity, from the wet and dry bulb data, should be left to those who make use of the information, as it introduces a second source of error, and so renders the value of the records less easily appraised by the expert.

The "screens" for the exposure of the thermometers should be of uniform pattern, and should, in all cases, be placed beneath a thatched shed about twelve feet in diameter, open at the sides, and well clear of neighbouring buildings, and the site chosen should be one which the

observer must visit in the course of his other duties in the evening, or be placed near his private quarters. The form of record would then run as in the example below.

STATION, Jaipur. LAT. $26^{\circ} 55'$. LONG. $75^{\circ} 50'$.
HEIGHT ABOVE SEA, 1,430 feet. MONTH, May, 1907.

Date	Dry Bulb Minimum	Wet Bulb Minimum	Dry Bulb Maximum	Wet Bulb Maximum	Rainfall Inches	Proportion of Cloud	Remarks
1	78.2	66.1	104.5	80.2	0	1	Heavy dust-storm
12							
		&c.,	&c.,	&c.,			
31							
Means							

Heaviest rainfall of a day, . . . Number of rainy days, . . .
Signature.

* NOTE.—In the case of rainfall, the total and not the mean of the month should be given.

It may be fairly claimed that all really important climatological data are included in the scheme outlined; that the facts required can be collected with the least possible trouble to the observers, and, the most important of all, that they are easily comparable.

Lastly, it may be pleaded that the reform is one that would cost nothing more than the few shillings required for the purchase of the two wet bulb thermometers, and that it can be effected literally by a stroke of the pen of the Colonial Secretary.

CO-OPERATIVE RESEARCH IN CLIMATOLOGY.

IN presenting to our readers the first "Climate" issue of the JOURNAL OF TROPICAL MEDICINE, the Editors desire to impress upon the alumni of the Livingstone College who have done so much to give interest to the pages of CLIMATE, now incorporated with this publication, that they look to them to continue the literary and material support afforded to its predecessor.

No class of men are better placed than the ex-students of that College for prosecuting and advancing the study of climatology, for they penetrate to the uttermost corners of the world, and are often stationed for long periods, where other

white men at most pay only flying visits, and they can thus render immense service to science by undertaking systematic observations at the scene of their labours.

The Jesuit missionaries have in a variety of localities done work of this sort of the greatest value, and surely Protestantism, which prides itself on its more liberal attitude towards science, should not allow itself to be put to shame by these self-sacrificing pioneers of civilisation.

The trouble and expense involved in systematic observations of this sort is singularly small, for the instruments can be bought for a sovereign, and five minutes daily is all the attention required. The Journal will be glad to furnish any gentlemen desirous of taking part in these investigations with a set of forms for each year's observations, and it is needless to say will gratefully publish the results when transmitted to them, besides which it is proposed to afford some little recognition of the service rendered to science by a complimentary gift of appropriate literature.

The Editors' idea is in fact to make the Journal the organising centre for the systematic extension of our knowledge of tropical climatology by the medical profession and the alumni of the Livingstone College. English meteorology would be in a most backward state but for the efforts of the Royal Meteorological Society, and it is our ambition to do something to emulate its invaluable work by organising the systematic study of the climatology of the back of behind. We indulge in the hope that a considerable number of gentlemen may be induced to participate in this scheme of co-operative research.

In the next (April) climatological number it is also proposed to include a short series of articles on the methods and aims of observations of this sort and the physical facts on which they are based.

DR. CHARLES F. HARFORD'S LECTURE AT CAMBRIDGE.

DR. HARFORD has devoted considerable attention to the best methods of interesting that section of the public who are concerned in various enterprises connected with the Tropics and especially those who go abroad as missionaries. His work has chiefly centred round Livingstone College, where a special course of training on well-defined lines is given to missionaries. Besides this he has organised several exhibitions of outfits for the Tropics and has sought to influence a larger circle by means of *Climate*. On Wednesday, November 22nd, 1905, Dr. Harford addressed a University audience in the anatomical theatre by the invitation of Professor MacAlister who, by a strange coincidence, was attacked by malaria on the very afternoon of the day, as the result of his

recent visit to Palestine, and so was unable to be present.

The lecture had the support of all the professors and teachers of the Cambridge Medical School, and Dr. Nuttall most heartily co-operated to make the occasion a useful one by arranging a demonstration of drawings of parasites and many interesting diagrams, and he, as well as Sir Patrick Manson and Major Ross, had lent many of the lantern slides which were shown at the lecture, which proved to be a valuable opportunity of setting forth the urgent necessity of spreading a knowledge of tropical health problems, and showing what is being done in this direction.

The chair was taken by the Master of Trinity who, in the course of a most interesting speech, strongly urged the importance of preventive medicine and illustrated his remarks by reminiscences of Jenner in the early days of vaccination. He also drew attention to the recent sanitary measures at Panama.

The lecture, which was entitled "Risks to Health in the Tropics: their Relation to Imperial Expansion and Missionary Enterprise," was a type of how a subject of the kind ought to be presented to the public. The necessity for educating the public in this country, in the meaning and nature of the chief scourges which attack our fellow-subjects in many parts of the Empire, may appear to many "stay-at-homes" of academic interest merely: but even to those who have never personally known what the dangers of a tropical climate are, but who take wider views of our imperial duties, let alone their humanitarian aspects, the subject of the health of both the white and coloured populations of the tropical parts of the Empire is one closely bound up with our daily life. If education in these matters is of direct interest to dwellers in these islands, how much more personal and immediate is it to the hundreds of millions of men and women who are exposed to the deadly diseases which prevail around them. Instruction how to protect themselves and to ward off disease from their children is a factor in their life which has hitherto been neglected; but, thanks to recent scientific discovery, it is now possible and ought to be the duty and pleasure of every man and woman who is capable of giving it. Dr. Harford brought out this point most clearly in his lecture and it is hoped his audience took the lesson to heart. Dr. Harford, in advocating the means whereby disease in the Tropics is to be fought, did not commit the mistake of advocating this or that nostrum, but strikes at the root of the matter by stating that the chief prophylactic measure we possess consists in the education afforded to medical men practising in the Tropics by the Schools of Tropical Medicine in London, Liverpool and Cambridge. He also pointed out what is being done at Livingstone College in educating missionaries in the rudiments of tropical hygiene. This most beneficent development is one of great national importance, for in many parts missionaries are the teachers of the children; and the education the missionaries receive at Livingstone College eminently fits them to give reliable instruction based on scientific methods in the schools under their charge.

At the London School of Tropical Medicine no fewer than 550 medical men practising, or destined to

practise, in the Tropics, had already taken out the course of instruction provided by the School. The Liverpool School of Tropical Medicine had gained a world-wide reputation by the numerous expeditions it had sent to gather information and to teach how disease is to be prevented. The Cambridge School had placed its laboratories at the disposal of men interested in Tropical Medicine, and had raised the status of this branch of medicine by granting a diploma in Tropical Medicine and Hygiene. At the Livingstone College 248 missionaries have availed themselves of the privileges there granted them, and have gone forth equipped in a measure unknown to their predecessors in the missionary field.

The lecture at Cambridge was amply illustrated by lantern slides, and, like all "teaching" lectures, the bald text is apt to appear meagre in comparison to the actual instruction conveyed. Dr. Harford, in his lecture, stated the principal diseases met with in the Tropics, and showed how many of these diseases were conveyed, and how they were to be avoided. He showed by simple tables the meaning of heat and moisture in a tropical, compared with a temperate, climate. A short account of the malarial parasite, its development in the blood of human beings and in the mosquito, and its mode of transmission by a particular species of mosquito, was illustrated by lantern demonstrations. Yellow fever, filarial ailments, and tick fever were dealt with in the same manner; nor was ankylostomiasis neglected. The methods of stamping out malaria advocated by Major Ross, and successfully employed by him at Ismailia, and by Dr. Malcolm Watson at Port Swettenham, were cited as instances of how malaria may be prevented by the destruction of mosquito breeding grounds. Dr. Harford, in his summing up of the subject-matter of his lecture, again advocated the necessity of educating not only the medical men, but also the natives, and especially the children in the schools, in the manner which had been so successfully carried out in the colony of Lagos on the West Coast of Africa.

J. C.

Reviews.

A HANDBOOK OF CLIMATOLOGY. By Dr. Julius Hann. Translated from the Second German Edition by Robert De Courcy Ward. New York and London: Macmillan and Co. Part I.

We have nothing but praise for this much-needed translation of Professor Hann's well-known work, as it forms the only available book on the general principles of climatology available to the English reader, in which the subject is at all exhaustively treated.

The original German work consists of three volumes, the second and third of which are devoted to regional climatology; and we think Professor Ward is well advised in confining his translation to the first volume, which deals with the general principles of the subject. Regional climatology is obviously better dealt with by local experts than by a writer whose experi-

ence is necessarily mainly confined to Europe. The book, however, is something more than a translation, for in addition to the examples cited by the original author, parallel cases, drawn mainly from American experience, have been added by the translator, which, even if they do not appeal specially to the English reader, at any rate make the illustrations fuller. Much new matter has also been added to bring the book up to date, together with plentiful references to English papers on the subject.

All this adds greatly to the value of the book, but best of all, the translation has been done into excellent English, so that involved confusion that appears inseparable from German prose composition is converted into a clearness of expression almost French in its style. The number of full stops has been, we should think, at least doubled, and the commas proportionately reduced in number, characteristics which make the reading a pleasant contrast to the general run of translations from German authors.

May we express a hope that Professor Ward may see his way to giving us a work on North American climatology; as encyclopædic as are the publications of the American Weather Bureau, the very completeness of the work of that model national institution making it extremely difficult for Englishmen (we refuse to say foreigners) to gain any clear idea of the climatic characteristics of the vast area with which it deals.

A HANDBOOK OF CLIMATIC TREATMENT, INCLUDING BALNEOLOGY. By W. R. Huggard, M.A., M.D., F.R.C.P. London: Macmillan and Co., 1906.

There are probably no specialists who more frequently require to prescribe "change of air" than those who deal with tropical diseases, whether while acquiring a hard-bought experience abroad, or when in after years the returned Tropical physician is sought out by the returned layman. Those still practising in the Tropics are continually meeting with cases in which change is not merely "indicated," but is an absolute matter of life or death; and the puzzle always is, where to send them. As a rule, the practitioner is content simply to get a patient out of the Tropics by the shortest route, with the result that he makes straight for his native place—perhaps Edinburgh in March—and is rewarded by a severer and more prolonged bout of malarial fever than he has had to endure in his entire tropical experience. The tropical practitioner's library must needs be select, if not absolutely scanty, and if it contain no work on health resorts he is hardly to be blamed; as it must be confessed that a large proportion of so-called balneological literature savours too strongly of the patent medicine vendor, the reader finding that the vaunted locality is "contraindicated" only in ingrown toenail and the acute stage of bubonic plague.

The work under review, however, concerns itself mainly with general principles, and is entirely free from pretentious matter of the sort alluded to, so that we feel sure it will be most useful to those who require a convenient epitome of climatic treatment, and to none less than the tropical practitioner.

We say this, albeit tropical maladies are scarce mentioned in its pages, and the word malaria does not occur

in the index, although there is a casual mention that malarial convalescents do well at Davos, a fact well known to most tropical specialists, with the reservation, of course, that they must be re-acclimatised in some moderately warm, dry climate before they can be considered fit for so tonic and bracing an environment.

It speaks highly, too, of the book, that even in the case of the author's own station of Davos, the contraindications are numerous and evidently the outcome of thoughtful experience.

Of the 520 pages to which the work runs, the first 60 are devoted to meteorology from the general point of view, and we are least pleased with this portion of the work, as it occasionally lacks the clearness of the rest of the book; some of the explanations being rather hard to follow, even to one fairly conversant with the subject. To our thinking, the space devoted to the subject, while far too short for exhaustive treatment, is too long for an outline, and there are occasional errors, as, for example, the explanation of the comparative coldness of the upper layers of the atmosphere, which is said to be "mainly due to the physical law of the expansion of gases." Now this law explains only the rather exceptional case of the coldness of up-hill winds, but the absorption of heat from expansion under these circumstances would rapidly be replaced by the sun's rays; were it not for the true reason, which is the universal operation of the law of selective absorption. Air, whether dry or wet, is very transparent to short-wave rays, but absorbs the long dark heat waves, such as are radiated by the ground, and therefore acts in the same way as the glass of a greenhouse, forming a sort of heat-trap. The more dense the atmosphere, the more efficient it is in this respect, and hence naturally the rarer upper regions, being less efficient heat-traps, do not trap as much heat.

Moist air is a much better trap than dry air, but this does not affect the explanation, as under any circumstances the upper layers would be to a greater or less extent cooler. In a book devoted mainly to the sanitary aspects of meteorology we should have expected better information as to the composition and effects of town fogs, but the subject is dismissed with a mere casual mention, and F. A. Russell's researches on London smoke deposits are not even noticed. Speaking generally, indeed, the bibliography of the subject is most scantily treated, so that the book affords but a poor guide to those whose interest having been aroused, would wish to follow up some point further. The construction in these chapters, too, is often loose; on page 47, *e.g.*, we are told that "the black bulb registered 55.5° C., while at the same time the temperature of the snow in the shade was 5.5° C." We presume the air over the snow is meant, for at 5.5° C. the snow, of course, would become water. Again, we are told at page 211 not to put faith in meteorological tables, when the author merely intends to caution us against comparing tables that, owing to varying hours of observation, &c., are in no way comparable; for he evidently very properly regards meteorological data as the only sound source of information. Still, such tables are rather wanting, and he cannot help wishing that the greater portion of the first 60 pages had been devoted to terse tabular statements of

monthly climatic data in connection with the various health resorts discussed. Other instances might be given, but we are not concerned in picking holes in a really meritorious piece of work, which can be thoroughly recommended to those who require a handy reference book of the subject.

PROFESSOR DAVIS ON THE EFFECTS OF ARIDITY.

THE current number of the *Geographical Journal* includes a paper on "The Geographical Cycle in an Arid Climate," by Professor W. M. Davis, which will be read with especial interest by all whose work has led them to such ill-favoured regions. The "geographical cycle is the period in which an uplifted land area will, if no disturbance occur, be worn down to base line by the processes of erosion." The absolute duration of such a cycle, therefore, varies enormously in proportion to the activity of the erosive forces, and tends to be indefinitely prolonged under conditions of aridity, where denudation by rain is insignificant, and the effects of wind only tend to predominate. The characteristics of the resulting desert landscape are broadly indicated, and will afford interesting food for reflection to those who have opportunities of visiting such scenes.

PROFESSOR KOCH'S WORK IN EAST AFRICA.

THE current number of the *British Medical Journal* contains a good abstract of Professor Koch's preliminary statement of his work in East Africa. The subject is, however, far too important to the special class of students of Tropical Medicine to be dealt with in this way in our pages. Its translation *in extenso*, and the reproduction of the numerous illustrations, are in progress, but necessarily take some little time to carry out. We hope, however, to be able to provide our readers with the paper in English dress in the first issue of the month of February.

SCORPION POISON.

So little is known about scorpion poison that it is satisfactory to find that the subject is being taken up by MM. C. Nicolle and Catouillard, who have been experimenting on the poison of the common North African species, *Heterometrus maurus* (C. R. Soc. de Biologi, 1905, pp. 100-102). So far their experiments do not seem to promise well for the discovery of either an antidote or a protective serum, as small doses conferred no immunity on rabbits. Antivenomous (snake) serum also has no protective action, though this could hardly be expected, as scorpion poison does not appear to resemble any form of snake poison.

At the same time, there must be some method of producing immunity, as all who have been in the East know that certain individuals, usually fakirs, obtain a curious power of handling these animals, and will allow themselves to be stung without suffering any apparent inconvenience.

G. M. G.

THE LONDON SCHOOL OF TROPICAL MEDICINE.

19TH SESSION—DECEMBER, 1905.

Examination for the Certificate in Tropical Medicine. Result.

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 „ H. M. Sauzier. With distinction.
 „ J. C. S. McDouall (Colonial Service). With distinction.
 Surgeon E. R. Whitmore (U.S. Army). With distinction.
 Dr. J. W. Arthur.
 Capt. J. Booth-Clarkson (Natal Medical Corps).
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Original Communications.

NOTES FROM ANGOLA.

By F. C. WELLMAN, M.D.

*Corresp. Memb. Am. Soc. Trop. Med.**(Concluded from p. 345.)*

NOTE XIX.—THE OCCURRENCE OF AN EMBRYO INTESTINAL WORM IN THE BLOOD STREAM AND ITS CONCEIVABLE IMPORT.

THE worm seen by me in the blood of an Angolan negress, and described in the Journal for February 15th, 1904, has been pronounced the larva of an intestinal parasite. Looss' discovery that larvæ of *Uncinaria duodenalis*, after piercing the skin, leave the subcutaneous tissue in the blood stream, and, passing through the right heart to the lungs, travel up the trachea and down the œsophagus to the stomach and intestines, has suggested to me that my worm may possibly be the larval form of some other intestinal parasite which, when observed, was in the process of reaching, by a similar route, its normal habitat in the alimentary canal. It may turn out that several forms of helminthiasis can be prevented by cleanliness of the skin.

NOTE XX.—ON THE POSSIBLE HETEROGENESIS OF *AUCHMERYMIA LUTEOLA*, FABR.

While engaged in working out the complete life-cycle of *A. luteola*, I was recently told by the blacks that its larvæ were capable of both sucking blood like a tick and also of embedding themselves in the skin. Further enquiry was rewarded by the appearance of a native with a small swelling in his side, from which I extracted a maggot identical (in size, shape and, so far as I could see, every detail, including the mouth parts) with the usual hæmophagous larva of *A. luteola*, so common in this region. I have since looked for, but hitherto failed to find, more than this single instance. It would be interesting should these anomalous blood-sucking maggots prove to be capable under certain circumstances (possibly when the skin is slightly broken from any cause) of causing, like their allies the larvæ of *A. depressa*, ordinary cutaneous myiasis in addition to their equally disgusting role as vermin.

NOTE XXI.—QUANTAN MALARIA IN TROPICAL AFRICA.

The writer for some time thought that probably the malignant parasite was the only form of malaria to be found in this region. During 1904, however, one case showing the quartan parasite was seen in Biké district, and during the past year (1905) several unmistakable cases of the latter infection were studied in Bailundo district. The type differs in no respect that I can detect from that seen in quartan cases in other countries. The infection cannot be recognised clinically, however, for in only one case was there slight irregular fever, while three other cases in which the parasite was plentiful and regularly going on with its cycle showed no symptoms whatever. Probably native

Africans who have become practically immune to the effects of *Hæmomenas præcox* are as a rule undisturbed by this feeble variety which at home sets up a very respectable fever. Out of a series of 531 natives recently examined by Mr. W. E. Fay and myself, 14 individuals showed the quartan parasite in their blood. Benign tertian has not yet been seen.

NOTE XXII.—INTOXICATING DRINKS, DRUG HABITS, &c., IN WEST AFRICA, AND THEIR RELATION TO MENTAL DISEASE.

The following remarks refer only to the Angola Bantus' :—

Alcohol.—They constantly use and occasionally get very drunk on their native beverages, principally maize beer ("ochimbombo"), and a mead made of honey and water ("ochasa"). Palm toddy ("alufu") is also drunk in some districts. Of late years the Portuguese, having ignored their agreement not to introduce rum among new tribes, that beverage has become common right into the interior.

Tobacco.—Universally used, generally in the form of snuff, but not seldom smoked; it is never chewed.

Hashish (Cannabis sativa) is smoked by a certain percentage of the natives; more common in some districts than in others.

Kola (Sterculia acuminata) is extensively used in some localities north of the Coanza River, so much so that there is a superstition among the blacks and Creoles that one cannot endure the climate without it, which is expressed in a rhyming proverb which may be roughly "Englished" in this fashion—

"Who doesn't eat Kola
Can't live in Angola."

"*Okapilanyau*" (*Burkea africana*).—The bark is chewed, and also occasionally inserted into the vagina by women as an aphrodisiac.

Mental disease is very rare among these people. Rum and hashish are the most deleterious stimulants used by them. I have heard the statement made that hashish smoking is a frequent cause of insanity among them. Such statements lack proof. Of the few cases of mental derangement I have examined none were hashish smokers.

NOTE XXIII.—A SUGGESTION AS TO THE PROBABLE RELATION OF CHIGGERS TO AINNUM.

I have recently pointed out on two occasions the possibility of chiggers bearing an etiological relation to ainnum. I have long noticed that the chigger has, even in healthy feet, a predilection for the under-surface of the little toe. When the skin of this region is, as is so often the case, cut or torn, the liability to invasion is increased, for one of the first things that one notices in regard to the chigger's habits is that it enters abraded or irritated surfaces oftener than sound skin. The inevitable inflammation and cicatrisation following such invasion accounts for at least part of the symptoms belonging to ainnum. I have stated this hypothesis more in detail elsewhere in a paper from which I here quote: "The fold of skin under the proximal joint of the little toe corresponding to the edge of the web between the toes is the point where wounds are oftenest made by the sharp grasses, &c., through which the barefooted native walks and runs.

The principal reason for this in the African is that the little toe of barefooted negroes lies separate from the others at an angle due to anatomical reasons connected with flat-footedness. As I have said, chiggers are oftenest found on the under-surface of this toe, even when all the toes are intact. When wounds are once made here, however, the chiggers persistently invade them, and must be removed constantly. While I do not wish to be read as advocating *S. penetrans* as the sole cause of ainhum, it seems to me that this insect must play a part (in some instances at least) in the continued irritation which, especially in blacks (who have a fibrogenetic tendency), may lead to the contracting fibroses occasionally resulting in the spontaneous amputation known as ainhum. It may be further stated that such a theory goes far to account for the geographical distribution of the disease, which is particularly common in the two great homes of the chigger, viz., tropical America and Africa."

NOTE XXIV.—THE INFLUENCE OF VARIOUS PLANTS ON THE HABITS OF MOSQUITOES.

On referring to my diary I find, scattered over two or three years, the following notes of experiments as to the effects of different plants on the actions of mosquitoes. In each case the test was not whether the mosquitoes would come to the plant in question, but whether the plant tested would drive the mosquitoes away when placed in one end of the cage containing them. As many substances such as wormwood, tobacco, chrysanthemum, pyrethrum, &c., when burned (and also various volatile bodies, viz., essential oils and various gases) will do this, it would not seem an unreasonable test. The mosquitoes experimented upon were principally of four species common here—*Culex hirsutipalpis*, *Heptaphlebomyia simplex*, *Myzomyia funesta*, and *Pyretophorus austeni*.

Castor-oil plants (*Ricinis communis*). No effect whatever. Both Anophelines and Culicines alight on the leaves quite as often as on banana leaves used for comparison.

Gum trees (*Eucalyptus globulus*). No effect unless the leaves are crushed, when the gnats seem to avoid them.

Pawpaw (*Papaya vulgaris*). No effect.

Sunflowers (*Helianthus* spp.). No effect.

On the other hand, large plants, when cultivated near quarters, afford shade (and even breeding places), and so actually increase the number of mosquitoes. The principal plants here which afford collections of water suitable for breeding mosquitoes are: a bamboo (*ombungu*), bananas (*ahondio*), metroxylon (*etome*) and especially two *Bromeliaceae*, *Amomum* sp. and *Costus* sp. (*ovomoma* and *ochiteke*). Some of these are cultivated as useful or ornamental plants. I personally know nothing of the "neem," or margosa tree of India (*meliceae*), or of the vaunted effects of *Chenopodium vulvaria*, *Solanum nigrum*, and other similar plants, but, in view of my experience with African plants, doubt on general principles their reputed efficacy. In view of our knowledge of the mosquito's hatred of light and sunshine, the most obvious protection to a bungalow is a large surrounding open space kept free from depressions and clear of high grass.

CONCLUDING NOTE.

In looking over these notes there occur to the writer other observations of interest which might have been added were the series not already so long. Some of these are: The effects of the venom of the puff adder (*Crotho arietans*), Additional Notes on the Mosquitoes of Bihé, Dental Caries among the Angola Blacks, Cutaneous Diseases, Venereal Affections and Eye Troubles in Angola, Tumours and Cancer in South-west Africa, the Climate of the Interior of Benguela, Reports on Various Collections of Entozoa, Noxious Arthropods, &c., &c. Several of these have, however, already been published in more elaborate papers and reports. The foregoing notes have served as a sort of clearing-house for some of the many scattering memoranda which collect in one's medical diary during the course of study and practice, and remain after the notes bearing on special investigations in hand have been transferred. If, therefore, I add to the observations contained in the preceding notes a list of the diseases not therein mentioned which I have reported from South Angola, the reader interested in the geographical distribution of tropical disease will be able to compare the district with other regions. These diseases are: Subtertian Malaria, Filariasis (*F. perstans*), Ankylostomiasis, Cestode Infection, *Oxyuris vermicularis*, *Trichocephalus dispar*, Bilharziasis, "Vonulo" (*Sternodynia neuralis endemica*), Leprosy, Ringworms, Prickly Heat, Leucoderma, "Craw-Craw" (severe scabies), Beri-beri, Low Fever, Heat Stroke, "Akutama" (*Neuritis peripheralis endemica*), Manioc Poisoning, Poisoning by Witch Doctors, "Onyalai" (hæmorrhagic bulla), Marginal Ulceration of the Gums, Keloids, Bites of Venomous Creatures, Milk-pox, Chicken-pox, Mumps, Epilepsy, Pneumonia, Spermatozemia, Gonorrhœa, Syphilis, Herniæ, Cancer and Tumours, Yaws, Blackwater Fever, Spirillosis ("tick fever"), Abscess of Spleen, Gundu, Ainhum, Climatic Buboës, Tropical Phagedæna, Myiasis, Multiple Nodules, &c., &c. New diseases and additional observations from this region which may be recorded from time to time will be published on some future occasion.

AN OUTLINE OF PLAGUE AS MET WITH IN BRITISH EAST AFRICA.

By JAMES A. HARAN, M.A., M.B., B.Ch.(Dublin).

Medical Officer, Mombasa, British East Africa.

PLAGUE is a specific infectious disease characterised by either—

(a) Local or general lymphatic tenderness and glandular enlargement.

(b) Septicæmia, associated or not with (a).

(c) Pulmonary or intestinal manifestations of a rapidly fatal character.

Previous to the establishment of European government, native tradition records two outbreaks, one among the Wateita, whose territory is about 100 miles from the coast, and the other among the section of Wakanionda dwelling on that part of the shores of the Victoria Nyanza now occupied by the terminus of the Uganda Railway. The latter people preserve a

very lively remembrance of the outbreak, inasmuch as the disease dislodged them from place to place for a period of years, and was accompanied by a fatal disease affecting their cattle. The neighbouring kingdom of Uganda has been frequently visited by localised outbreaks, and is known to the natives as "Kaumpuli."

Since the establishment of the Protectorate five outbreaks have been noted, two of which were preceded and accompanied by the wholesale death of rats. Three of these took place at stations on the Nyanza, and two at Nairobi, a headquarters station 326 miles from the coast, and 5,800 feet above sea-level.

The *Bacillus pestis*, the exciting cause of the disease, is a non-motile, non-sporing, aerobic organism with rounded ends, 1.5μ in length, stained by ordinary dyes, and decolourised by Gram. The colouration is best marked at the poles, the central area being left unstained. It is of low vitality, and easily destroyed by sunlight. The usual procedure for its demonstration is the introduction, with the usual precautions, of an exploring needle into the enlarged gland or bubo of the patient. The piston is then slightly withdrawn and the needle removed, the unstained fluid being ejected and spread on a slide. The puncture is covered with antiseptic dressing.

Leishman's is a useful and ready stain with which to treat the film. A pure culture is usually demonstrated. The sputum in the pneumonic form affords material for excellent smear preparations. In rats and cats the bacillus can be detected by means of smear preparations made from sections of the submaxillary glands and the spleen. In dead bodies smear preparations can be made from the particular organs found to be affected.

I am inclined to think that puncture by an exploratory needle of a plague bubo in a living patient is not altogether a harmless proceeding, inasmuch as it allows additional infective material to enter the blood stream, as well as injuring a gland or mass of glands engaged in opposing the entrance of infection. In doubtful and mild cases it is very useful for purposes of diagnosis.

The bacillus has been demonstrated twelve times after death. In some cases the staining reaction was not well marked, while in others a bulbous enlargement was observed at one or both poles.

The disease is usually conveyed by—

- (a) Infected rats.
- (b) The discharges of patients.
- (c) Infected food.

When a community of rats is invaded by the disease those which are unaffected emigrate in a body from the area, to return at a later period. At the commencement of the outbreak in Kisumu during the present year a European who was camped some distance outside the settlement was surprised one night to find his tent invaded by swarms of rats passing through, apparently in a hurry and from the direction of the town. He had no further visits, and a few days later the first cases were discovered.

The diseased rats emerge from their burrows and stagger about in the open, passing large quantities of infective dung. It is easy to understand that individuals walking on this material with bare, abraded,

and cut feet, collecting the sweepings of the floor with injured hands, or not washing their hands subsequently, and using them (as natives will) instead of a suspensory bandage, are liable to contract the disease. I happened on a case in which a Beluchi slept on the floor of an infected house with an abraded ear, and was subsequently brought into hospital with a cervical bubo. In another instance a boy was secretly ordered to sweep the floor of an infected house, with the result that he was dead the next afternoon of pneumonic plague, presumably caused by inhalation of the dust. As a native eats with the hand direct there is also danger of food contamination.

The discharges of patients are especially dangerous in the pulmonary form of the disease.

The bubonic variety does not apparently possess such grave terrors. We had one case of an Indian child with an axillary bubo, who was attended by a servant of his own caste. This latter was supposed to sleep close at hand on a rug, but I frequently caught him sleeping in the same bed. He never developed the disease. The discharge from suppurating buboes has been frequently examined, but most usually no bacilli have been demonstrated.

Clothes soiled by discharges, after exposure for some time to the sun, would seem to be harmless, if one is to credit the records of the Egyptian outbreaks of the commencement of the last century. Among them one finds it stated that the wearing apparel of the dead were hawked through the streets, and that they were subsequently worn by their buyers with impunity.

Food is liable to be contaminated by the discharges of infected rats, which are found dead or dying among bags of grain, &c., or by the dust of infected areas. Consumption of such may give rise to the bubonic form, involving the submaxillary glands, or to the intestinal form. Predisposing causes may be summed up as insanitary habits and defective houses. The barefooted and poorly fed Asiatic, who insists on excluding all possible light and air, whose ablutions are nominal, and who prefers to dig a latrine in the floor of his bedroom rather than go outside, can hardly be accused of possessing powers of resistance to disease. The structure, moreover, of his house leaves much to be desired. It usually consists of an earthen plinth, faced with mud and stone, on which is built a galvanised iron shop and dwelling place combined. Windows and ventilation are avoided, if possible. Within, as much merchandise is placed as can well be stored, his bed being almost surrounded by bales. Unless for sale purposes these are never shifted, so that a practically permanent home is afforded to the rats. Thus, on an outbreak taking place among these rodents, evidence is concealed for some time.

CLINICAL COURSE.

The incubation period varies between twelve hours and seven days. I have been unable to ascertain the presence of any signs or symptoms during that period, such being, perhaps, due to a desire for concealment on the part of the patient when brought to hospital, or to mental torpor resulting from the infection and consequent inability to answer questions coherently. The invasion is sudden and characterised

by intense headache, vomiting, sometimes diarrhoea, epistaxis, furred tongue, and a rise of temperature to between 102° and 104° F. The respirations vary between 30 to 40, the pulse between 130 to 145, being small and compressible. The gait is staggering and the voice thickened. The face is pale and characterised by an expression of fear. The conjunctivæ are injected. In the bubonic form the appearance of a bubo may be simultaneous with these signs or may follow within forty-eight hours. The commonest situation is in the femoral region. They may also be found in the axillary, post-cervical, transverse inguinal, or lumbar groups, or involving one or more of the submaxillary glands. General gland enlargement is occasionally met with. Tenderness along the course of the lymphatics is always present, as well as in the regions of apparently unenlarged glands. The bubo consists of a conglomeration of inflamed glands. It may not be larger than the terminal phalanx of the little finger and may remain so during the course of the disease. On the other hand, it may gradually enlarge and, before death, present a tumour as large as the closed fist. It is granular, hard, intensely tender on palpation, and is surrounded by a large area of infiltrated cellular tissue. Movement is avoided, as it causes exquisite pain. Incision at this stage liberates a small quantity of bloody serum which, under the microscope, shows a pure culture of the *B. pestis*. As the disease progresses the bubo usually enlarges and the general symptoms become more severe, temperature varying between 103° to 104°, respirations 40 to 60, pulse 145 to 160. The voice becomes incoherent and the patient unable to stand. The tongue is dry, brown in the centre, and red at the tip and edges. Secondary buboes appear, e.g., in femoral manifestations, the iliac group, axillary, the infra-cervical. The area of periglandular infiltration increases. In the femoral region it forms a large triangle with the base resting on Poupart's ligament. In the axilla the swelling extends from the inner wall up to and above the clavicle, and may cause œdema of the arm. In involvement of the submaxillary glands the lower part of the face, on the affected side particularly, is so swollen as to render the patient almost unrecognisable. All the above changes may take place within forty-eight hours. Secondary pneumonia of fatal import sometimes appears, causing hæmoptysis, and pain and tenderness over the affected area, with fine crepitation on auscultation, the expectorated blood being full of bacilli. Between the third and sixth days in the bubonic form cases usually die. Should the patient survive and the bubo go on to suppuration, boggy and redness appear over the infiltrated mass about the sixth day, followed by fluctuation on the eighth and twelfth day. On opening the abscess the general symptoms at once disappear, the temperature falling to between 96° and 97° F. morning and evening, the pulse below 70, and respirations 14. The tongue clears and the abscess cavity rapidly fills up. At this period a pseudo-dysentery, with tenderness over the colon, is very frequently observed, and is probably due to elimination of the toxin. During the healing of the wound the infiltration gradually lessens and the glands slowly reappear from the mass. A certain amount of thickening and

gland enlargement persist up to at least three months and probably for some years.

In favourable cases not ending in suppuration, the termination of the disease is reached more slowly, subsiding masses of glands remaining tender for a long period, and liable, on slight or non-appreciable causes, to become enlarged again. Rises of temperature, associated with delirium, may accompany these manifestations. Pseudo-dysentery has been also noticed at the conclusion of these cases.

In fatal cases of the *bubonic variety* the general symptoms and signs become aggravated, the temperature falling to 100° or 101°, respirations exceeding 60, pulse uncountable. Râles are found on auscultation over the pulmonary area. Restlessness and subsultus appear. Involuntary evacuation of bladder and rectum may take place. Bubonic tenderness persists to the end. With all this the patient may preserve some degree of consciousness to the end, which is caused by failure of the cardiac centre, resulting from toxæmia. One case, that of an Indian babu, was in my charge, who insisted on lighting a cheroot. I went outside for a moment, leaving him puffing with evident enjoyment. On my return within two minutes I found the man dead.

In the *septicæmic variety*, gland enlargement, usually general, with lymphatic tenderness, may or may not be present. The onset of the disease is sudden, the patient soon becoming delirious, with heightened colour, subconjunctival ecchymoses, and dry, brown tongue. Epistaxis appears early and sometimes continues, at intervals, during the course of the disease. Jaundice, with involuntary action of the bladder and rectum, quickly ensues. The spleen is enlarged and tender. Coma follows, and a fatal termination may be expected within three days of the onset of the disease. In this form of plague the pulse and respiration are even more rapid than in the preceding. The temperature runs the same course.

I have seen but one case of the *intestinal variety*. It was that of a man resident in a quarantine camp with others for purposes of observation. They had been removed from some houses in which plague had broken out. The patient in question was suddenly taken ill about midnight with abdominal pain, vomiting, diarrhoea with hæmorrhage, and collapse. Constant evacuation continued during the night, but ceased with the advent of morning. Patient's temperature was 101° in the mouth, pulse 150, and respirations shallow and rapid, cutis anserina, and the tongue dry, furred and shrunken. A patch of bronchial breathing, with associated dulness and tenderness, appeared in the right apex and was accompanied by hæmoptysis. Patient died at one in the afternoon, the entire manifestation having lasted about thirteen hours.

The *pneumonic form* is the most fatal to the patient and dangerous to the attendants. In a case which came under observation the boy, an African, had been secretly engaged on the previous day to sweep out a house in the infected bazaar, which had been temporarily evacuated. The next morning the boy was awakened at four o'clock by a severe pain over the sternum and hypochondria, associated with dyspnoea. On being brought to hospital he could not

stand. He was lethargic, the voice was thickened and verging on incoherence, conjunctivæ suffused, temperature 103°, pulse 140, and respirations 60. On examination dry crepitations were found on auscultation over the bases of both lungs, with diminished resonance. Cough and expectoration were absent, as well as gland enlargement and tenderness. Two hours later the patient had passed into a state of torpor, the tongue being dry, black and shrunken, and lying in the bottom of the mouth. Bladder and rectum were acting involuntarily. Respiration was extremely rapid and shallow, and the pulse scarcely perceptible. He died at 1 p.m., the disease having run its course within nine hours. Infection in this case was due to inhalation of the dust.

Post-mortem appearances are: marked rigor mortis in association with well-marked putrefactive signs, submucous, subserous, or cavity hæmorrhages. Effusion into the various cavities, congestion or consolidation of pulmonary areas, pial congestion, enlarged spleen, tissue staining in the neighbourhood of vessels, enlarged masses of agglomerate glands, purple on section, the surrounding tissues being engorged with hæmorrhagic fluid. Intestinal congestion, the lumen being occupied by blood-stained fluid or actual blood casts. Heart chambers may be occupied by unformed clot.

TREATMENT should be of a stimulating character from the commencement. The early administration of brandy in frequent doses is often attended with good results. Digitalis and strychnine are also useful. The hypodermic infection of Yersin's serum is of the highest value. In the bubonic forms, belladonna and glycerine fomentations, or linseed meal applied locally, relieve the pain. I have seen improvement following on the hypodermic administration of morphia and strychnine. When fluctuation is palpable the pus should be liberated by free opening. Incision prior to the advent of suppuration is harmful. After evacuation daily dressing with pieces of cotton-wool saturated in 1-1,000 hydrarg. perchlor., may be applied and fixed by a bandage soaked in the same solution. I have never found drainage necessary. The cavity fills up quickly. Fluid diet is given in the earlier stages; solid diet may be resumed as soon as the bubo has been opened, should it suppurate, otherwise the special circumstances of each case have to be studied. I have seen patients given solid diet through the entire course of the disease. In the intestinal form stimulants and astringents should be administered vigorously, very little time, however, is available. It is possible that Yersin's serum in large doses would be of advantage, but the great exhaustion which quickly follows the onset of the disease should not be forgotten.

The pneumonic form is practically hopeless as regards treatment. Stimulants and Yersin's serum may be administered freely. The septicæmic variety may be treated on similar lines. Isolation is essential in the septicæmic, intestinal and pneumonic forms, more especially in the last. The medical attendant should make his examination in the open air, if possible. Should the patient be expectorating aimlessly in every direction, the wearing of some form of face protection is to be recommended. In its absence I should be disposed to cover the patient's face with a towel, which

might subsequently be boiled. A drawback to such procedure may be the possible irritation on the patient's part. In such eventuality a lot may be taken for granted. When it is considered that the subjects of suppurating buboes (which result from a mixed infection) frequently recover, should they survive the earlier days of the disease, it might be useful were experiments made in the administration of measured doses of toxin, derived from pyogenic cocci, to animals inoculated with plague. There would seem to be an antagonism between the former and the *B. pestis*.

PROPHYLAXIS.

Cleanliness, light and air, rat-proof houses, and the destruction of these rodents, are essential. An outbreak of plague rarely reaches large proportions, unless the rats are involved. Experiments are in progress with a view to obtaining a germ capable of causing their wholesale destruction. The Danysz bacillus has been successful with mice, and it is to be hoped will prove equally so with rats. When a case occurs in a house the patient should be removed to hospital and the other residents placed in an isolated building or camp under observation. Persons wearing boots should then enter the house and first lay the dust by freely sprinkling the floor with a solution of Jeyes' crude carbolic or other antiseptic. The goods and furniture are then taken out and placed in the sun, all rubbish or uncleanly material being destroyed or disinfected. Additional windows may be made, if thought necessary, and they, together with all doors, should be left open. The walls are then covered with limewash, and the floors sprinkled freely with lime, or saturated with strong carbolic or corrosive sublimate solution. Haffkine's prophylactic may be administered to those isolated for observation. This is usually injected in varying doses and with antiseptic precautions into the outer side of the arm. Within twelve hours reaction occurs, accompanied by rise of temperature, and pain, tenderness and enlargement of the corresponding axillary glands. The temperature quickly subsides, but the gland phenomena persist for about a fortnight.

Inoculation gives rise at first to an increased susceptibility to infection, followed in a week or so by an immunity, which persists for a fortnight or three weeks. The advantage of the measure is that it replaces to a certain extent the more cumbersome practice of quarantine. Despite the above, plague may persist, the rats continuing to die. When these are involved the length and extent of an outbreak probably depend on the time the disease takes to work through the affected rat community and the extent of country over which that community ramifies. When cleanliness and general precautions have failed we have caused the evacuation of the infected area, placing the inhabitants in tents. This is a costly proceeding and only possible in small settlements. Were one certain of the guard and the weather, it might suffice to sleep in the streets, leaving all doors and windows of the houses open. This remark, of course, applies to tropical countries.

In endemic areas it is possible that the disease constantly exists among the rats in a very mild form, and that increase in their numbers or aggregation in

human habitations causes an aggravation of the type and consequent communicability. It might be of interest to hold enquiry into all lymphatic manifestations occurring among the inhabitants of an endemic area, as it may not be impossible that the disease is constantly present in a mild form and passes unobserved.

AN OUTBREAK OF ACUTE CONTAGIOUS CONJUNCTIVITIS IN CEYLON.

By Sir ALLEN PERRY, M.D., D.P.H.,

Principal Civil Medical Officer; and

ALDO CASTELLANI, M.D.

In March of last year our attention was drawn to several cases of the above disease which occurred in the city of Colombo, and our thanks are due to Dr. W. H. de Silva, the Ophthalmic Surgeon of the General Hospital, for his courtesy in placing at our disposal the clinical material for the preparation of this paper.

In our experience such an outbreak had not been seen previously, and we have the authority of Ceylon practitioners of longer experience of eye diseases in the island than ourselves, who state they do not remember a similar occurrence.

The first cases were thought to be examples of gonorrhœal conjunctivitis until a bacteriological examination of the secretion demonstrated the error. As a noticeable characteristic the outbreak was limited practically to the well-to-do classes, there were more Europeans attacked than those of any other race, and it was almost unknown among the poor. The onset of the disease was sudden, with early symptoms of an alarming nature, and its course was rapid. It yielded readily to treatment, and serious complications were rare.

During the prevalence of the north-east monsoon in the early months of the year the meteorological conditions over the western part of Ceylon are high temperature, low humidity, a long spell of drought, and uninterrupted brilliant sunshine. These conditions seem to favour the development of a small fly, one of the family *Muscidae*, popularly known as the "eye fly," from its habit of always trying to settle on that organ.

At this season of the year the surface of the roads is pulverised by the traffic into an irritating red dust, which is blown about by the wind in clouds, and it is usual to come across many cases of simple catarrhal conjunctivitis in all classes, particularly among the prisoners in the gaols. The cause of this affection is commonly attributed to the dissemination of infective particles by one or other, or by both, of the above-mentioned effects of the meteorological state. No history of the introduction of acute contagious conjunctivitis could be traced, but the probability of this is great, considering the large number of ships that arrive at the port daily, bringing foreigners from all parts of the world. The symptoms of this outbreak were an acute onset with great swelling and discolouration of the eyelids, an early watery discharge becoming muco-purulent and in some cases

purulent, swelling of the conjunctiva, especially of its ocular portion, with subconjunctival hæmorrhages (the hæmorrhagic catarrhal conjunctivitis of Nettleship), and photophobia with pain of a burning character.

The cases were extremely infectious, more than one member of the same family being attacked.

In many instances both eyes were affected. We consider the incubation period was from twenty-four to forty-eight hours.

The ages of the patients ranged from two years to forty years, the greater number were in children and young adults. An attack lasted about three weeks, and as a rule there were no complications. Haziness of the cornea occurred in a few cases, and in only one of them was there any permanent corneal damage. This case is so interesting that we give it some detail.

The patient, a planter's daughter, 2½ years of age, living in a remote part of the country, had been suffering from the affection in both eyes for about a week before she came to Colombo. When seen by us she had great swelling of the lids, blepharospasm, a purulent discharge, and an ulcer on the lower segment of each cornea, with a bound-down pupil on the left side. In the experience of one of us the destruction of corneal tissue in cases of gonorrhœal conjunctivitis generally occurs in the lower segment of the cornea; the reason for this determination of site is the extra pressure there, produced by the overlapping of the upper lid; these conditions were present in this particular instance.

The ulcer on the right side and the general condition of that eye yielded rapidly to treatment, but the corneal complication of the left eye increased in depth and area, notwithstanding the application of pure carbolic acid and subsequently the actual cautery. After some days the destructive process stopped and the ulcer was seen to be filled by a yellowish-grey membrane, the surface of which was glistening and level with the rest of the cornea. This membrane was easily peeled off, leaving a clean, ragged bed; a fresh layer formed within twenty-four hours after each time it was removed. The membrane was examined by one of us for the Klebs-Loeffler bacillus with a negative result. This pseudo-membrane may have been the result of the caustics, or more likely it was an instance of the development of an exudation which is said by Weeks to happen in 4 per cent. of cases of acute contagious conjunctivitis. The formation of the pseudo-membrane continued for about a month and the child made a fair recovery, but with a scar which is likely to be permanent.

Bacteriological Examination of the Cases.—We have examined microscopically and bacteriologically the secretion from six patients.

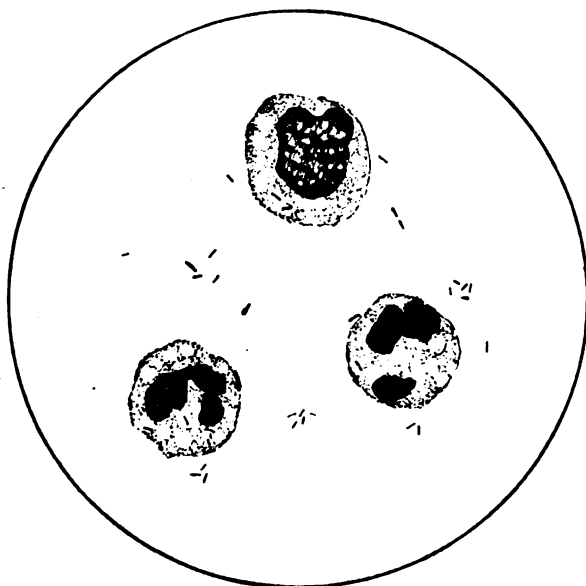
Fresh and stained preparations were made. The discharge consisted of numerous leucocytes, most of which were polymorphonuclear; some fibrinous threads and a few squamous epithelial cells; occasionally some erythrocytes could be seen. In fresh preparations, using a high power and a very small diaphragm, some short, slender non-motile rods could be detected.

Films stained with the usual aniline dyes showed fairly numerous bacilli. The stain which brought them

out best was diluted carbol-fuchsin (1 in 20), which was allowed to act for ten minutes. These bacilli appeared as short, thin, straight rods, evenly stained throughout their length, which varied from one to two microns; no capsule was present.

The organisms were often grouped together irregularly; in rare instances some were arranged in short chains. Many were contained in the protoplasm of the leucocytes.

The bacilli were decolourised by Gram's method. These morphological characters suggested to us at once the probability of our being in the presence of the Koch-Weeks bacillus, which proved to be the case by



Preparation stained with diluted carbol-fuchsin.

the results of the cultural investigation. We employed the ordinary laboratory media, as well as blood agar prepared by smearing on the surface of the agar tubes some drops of blood taken aseptically from the finger; the media were inoculated with the purulent discharge under aseptic precautions. In the first case examined all media, including those containing blood, remained sterile, with the exception of one agar tube, which showed three or four colonies of the *Micrococcus pyogenes albus*.

In the remaining five cases the blood agar medium, kept at a temperature of 35° C., showed after thirty to forty-eight hours some growth; and of the other media some remained sterile, while others showed a few colonies of staphylococci. The blood agar tubes presented small, roundish, translucent, dew-like colonies, with very little tendency to become larger or confluent. Preparations from these showed small non-motile bacilli well stained by diluted carbol-fuchsin and not stained by Gram's method. We succeeded in obtaining subcultures from these colonies on blood agar, while we always failed with the ordinary media. The organism showed a great tendency to die out rapidly.

The morphological and cultural characters described clearly show that the germ isolated by us was the typical

Koch-Weeks bacillus (*Bacterium ægyptiacum*, Lehmann and Newman). We must add that in one case (Case No. VI) we found associated with it a bacillus of the xerosis group. On the blood agar tubes in this case, besides the typical colonies of the Koch-Weeks bacillus, there were larger, opaque, granular colonies easily distinguishable. Preparations from these colonies showed bacilli which were well stained by Gram's method. To this association of the xerosis bacillus with the Koch-Weeks, we are not inclined to place much importance, as it is well known that the xerosis bacillus can be found very frequently in any inflammation of the conjunctiva.

Pathogenicity of the Koch-Weeks bacillus isolated in Ceylon.—We have made several attempts to infect animals. We give here a few examples of our experiments.

Experiment 1. Monkey.—Into the conjunctival sac of the left eye were instilled three drops of the purulent discharge containing many Koch-Weeks bacilli collected from Case No. IV. Result: Nil; not even the slightest hyperæmia was noted.

Experiment 2. Monkey.—In the conjunctival sac of the right eye an emulsion of two loopfuls of a blood agar culture of the Koch-Weeks bacillus was instilled drop by drop. Result: Nil.

Experiment 3. Monkey.—The conjunctiva of each eye was scarified by means of a sterilised pin. In the left conjunctival sac an emulsion in broth of one loopful of a blood agar culture was instilled. Result: Marked hyperæmia; the same degree of hyperæmia, however, was present in the other eye, where the scarification was not followed by the inoculation of the organism. In the inoculated eye the germ could be recovered during the first five hours, afterwards it disappeared completely.

Experiment 4.—The discharge taken directly from the patients' eyes, and in other cases emulsions of cultures, were injected into the conjunctivæ of several rabbits, guinea-pigs, and white mice. Result: Nil.

Experiment 5.—To study the virulence of the strains of the Koch-Weeks bacillus isolated by us, several guinea-pigs and rabbits were injected subcutaneously and into the peritoneum. All the animals survived without showing any signs of malaise. These researches on the pathogenicity of the Koch-Weeks bacillus found in Ceylon, gave the same results as have been arrived at in other countries, viz., that the germ is practically non-pathogenic for the lower animals.

"Clinical Studies," November 1, 1905.

SPLENIC ANÆMIA.

Bramwell, B., treated a case of splenomegaly with ferri carb., grs. v. thrice daily, and exposure of the splenic area once daily to X-rays. The spleen slightly diminished in size and the red blood count improved. In another case, boric acid in 20 grain doses in conjunction with quinine hydrobromate, grs. v., and tinct. ferri perchlor., min. x., allayed the febrile symptoms, and improved the general condition, but did not diminish the spleen. The temperature seems to have fallen in consequence of the exhibition of boric acid.

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THE

Journal of Tropical Medicine

FEBRUARY 1, 1906.

THE DEPRECIATION OF THE ATTRACTION OF THE INDIAN MEDICAL SERVICE AND ITS REMEDIES.

I.

No body of medical men have done more to advance our knowledge of tropical maladies than the officers of this ancient and honourable service, and its welfare is therefore of great public importance. In the early days contributions by practitioners in the Tropics to medical literature were evidently regarded by their brethren at home almost in the light of travellers' tales, or at any rate of no more than a curious interest to the general body of the profession. The establishment of tropical medicine as a distinct branch of the healing art may, indeed, be said to date from the establishment of a chair on the subject at Netley, to which a retired Indian medical officer, the late Professor Maclean, was appointed.

Maclean was a man of exceptional ability, as well as a born lecture-room orator, and his lectures and valuable systematic work on the subject soon elevated tropical medicine to a recognised position in the medical commonwealth. He taught, amongst other forecastings of modern opinion, the value of the mosquito net in the prevention of malaria and the communicability of cholera through the agency of water ; though it must be confessed that it never seems to have occurred to him that the efficacy of the mosquito net might be due to its efficiency in excluding mosquitoes.

From the therapeutic side, however, his book may to this day be consulted with the greatest advantage, and it is a pity that no new edition has been prepared, as this side of the question has been a good deal neglected in the more modern works on the subject. About the early eighties the service seemed to be neglecting to maintain its reputation, though the work of Carter, of Bombay, on spirillum belongs to this period.

The burning question of the day was, however, the etiology of cholera, and the conflicting interests of the time led to unbiassed research being placed beneath the cold shadow of official disapproval. The Indian Government quite rightly regarded quarantine as useless, but unfortunately fell into the error of believing that its adoption depended, not on the question of its efficiency and expediency, but on that of the communicability or otherwise of the disease. When keen and scientific officers recorded facts tending to prove communicability they were accused of "theorising," and deliberately ordered to delete the facts from their official reports, so that a reputation for a weakness for research was about the worst a man could earn who desired to succeed in the service. The visit of Koch to India, however, tumbled the whole flimsy edifice based on the *suppressio veri* about the ears of its authors, and what is more, demonstrated the inapplicability of quarantine ; but the men who would have worked had packed away their microscopes in disgust, and it was some years before this blow to efficiency could be recovered from. The Indian Government had not, however, learned its lesson. It formally punished King, of Madras, for invaluable original work on the vaccine virus, and when Ross made his great discovery it first obstructed his work, and then, after according some tardy and grudging support, made no efforts whatever to retain the services of the brilliant investigator it found to its hand within the ranks of its own servants. Was there ever a better case for selective promotion ?

There are signs, indeed, that matters are improving in regard to the promotion of research, but the man who should have been the honoured and rewarded head of that department has been lost to India to Liverpool's gain. To this day,

however, the best advice that can be given to the would-be recruit for the I.M.S. is as follows: Qualify at as early an age as possible. Do not waste time by taking up a resident medical appointment in your hospital, or in acquiring such useless lumber as an honour, degree, or a qualification in public health, but go up for the first examination that occurs.

As the keenness of the competition has a good deal diminished you will probably get in somehow; and your position on the list will have so little influence on your future career that six months seniority on the list will avail you far more than the kudos of being highly placed in the competition. The truth of this will be especially apparent towards the end of your period of service. Only the other day thirteen excellent officers were "passed over" for promotion simply because they were too old. There was no other reason; for the thirteen included men holding most distinguished records, and who, moreover, were known to be *personæ gratae* with the authorities, who really had no choice in the matter.

Once in the service stick to routine work, preferably on the military side, as the civil branch no longer presents any particular pecuniary advantages, and you will have light, pleasant work, and serve in the pleasantest stations.

Above all, avoid all suspicion of originality or special ability in any particular direction, as it may lead to your being placed on "special duty," and when you return to the ordinary line of work you will find yourself penalised, as if employment of the sort were an indictable offence.

No one who knows the service will deny the soundness of the above advice, and it further cannot be denied that the fact of the expediency of such counsel reveals a state of things that urgently calls for reform.

For the routine work of the service, good, average men whose professional experience outside the lecture-room is strictly limited to India will always be available in sufficient numbers; but the Indian service includes so many appointments for which such humdrum credentials are entirely inadequate that every effort should be made to attract men of matured study and exceptional qualifications.

With this object the following reforms are respectfully suggested to the "powers that be":—

(1) The present age limits are absurd under modern conditions of medical education. Practically speaking, it is impossible for the ordinary student to qualify under two or three and twenty, and a man who completes his education by taking a resident medical officership and an honours degree cannot possibly enter till he is twenty-five or twenty-six, under which circumstances it is quite impossible for him to reach the highest ranks of the service.

The age limit should be absolutely done away with, and in its place a term of service substituted,

say thirty-five years in the case of promotion to colonel, and thirty-seven in the case of surgeons-general.

To judge mankind by its years is a rule-of-thumb absurdity.

There are plenty of veterans of sixty who can hold their own even in practical field sports; and if men far in advance of this limit be physically and mentally fit to act as Cabinet Ministers they may surely be trusted to cope with the far lighter strain of the efficient conduct of the duties of director-general of a medical service. A man prematurely senile would presumably not be selected for promotion to so important a post; and if physically unfit, the ordinary mechanism of invaliding, which is applied to officers of all grades, may be trusted to deal with the difficulty.

(2) Every effort should be made to attract men of the highest qualifications.

It will not be enough to allow time spent as resident medical officer of a teaching hospital to count for service and pension. In addition, a monetary bonus should be given to successful candidates who have sacrificed immediate pecuniary returns to the desire for professional efficiency. The same arguments apply to the holders of honours degrees; that is to say, those that require more prolonged study than is exacted for bare qualification; the F.R.C.S. and the holder of a qualification in public health for example. To those who have gained such degrees a small extra allowance should be made.

Engineering firms find that they cannot obtain a fitter for the same wages as a rivetter, and to offer the same rate of pay that is given to bare qualification to the finest flower of the medical schools is to put into practice the ideals of the worst school of trades unionists who would reduce all workmen, bad, good, and indifferent, to the same dead level of remuneration.

In the sister service of the R.A.M.C. the expediency and justice of rewarding men for the labour involved in acquiring additional professional knowledge has been recognised by the grant of what is known as specialist pay. We consider, however, that while the principle of rewarding exceptional zeal and ability is entirely sound, this particular application is a mistake.

It is an abuse of the ordinary application of the word to dub as a specialist a young fellow who has merely passed a few months in the clinic of some special hospital; for men cannot be converted into specialists in the same way as the pork butcher turns out an Oxford or a Bologna sausage by stuffing a skin with varying kinds of meat.

True specialism can only be attained by those who have laboured to give themselves an exceptional general training, and have then devoted special study and observation to a particular class of cases; and the best evidence of fitness to be-

come a specialist is the possession of an honours degree.

At any rate, the plan is entirely inapplicable to a service in which a large percentage of officers have, for example, far better claims to call themselves eye specialists than the majority of London ophthalmic surgeons, numbering their successful operations by hundreds when the latter can boast only of tens. Just fancy the position of the young officer who presented himself before the university professor in charge of the Eden Hospital, Calcutta, as an obstetric specialist.

The system would be killed by ridicule; but no such objection could be raised to a special allowance to the holders of honours degrees, as all are well aware of the time and labour involved in their acquirement, and there can be no doubt that it would enormously stimulate post-graduate study within the ranks of the service.

THE HYGIENE OF TRAVEL IN TROPICAL AFRICA.

PROFESSOR KOCH'S valuable communication, a full translation of which appears in our columns, is naturally mainly occupied with etiological questions, but contains one very obvious prophylactic recommendation with respect to tick fever. This is to the effect that officers travelling should seek out fresh ground at halting places on which to pitch their tents. The proposal is a very proper and natural one, though it indicates a certain amount of unfamiliarity with the difficulties of tropical travel; for there are undoubtedly an enormous number of situations where, owing to the closeness of the jungle or the difficulty of obtaining supplies, it would be absolutely impossible to carry it into effect.

When a possession has passed beyond the stage of exploration, and has entered that of occupation and administration, officers must needs be continually passing to and fro, and it is clear that any such procedure is absolutely out of the question; and that to avoid interference with private rights, special camping grounds must necessarily be adopted even in fairly open country. Under such circumstances, Koch's recommendation becomes a mere counsel of perfection. What should be done is that at all habitual halting places, a sufficient space for the tents of one or two European officers should be fenced in, and if possible macadamised. Moreover, as quite apart from humanitarian considerations, it is most inconvenient and fatal to service efficiency that native subordinates and followers should become infected; a considerably larger space should be similarly hardened for their accommodation when bivouacking for the night.

The ticks harbour in dust, and are not so

constituted as to be able to burrow into a hard surface, so that by insisting on such a ready prepared surface being swept, a very fairly efficient degree of protection would be afforded.

What, however, would Koch have said had he been dealing with the ordinary travelling customs in vogue in most parts of British Tropical Africa where our officers are unable to carry tents at all, owing to the insufficiency of the amount of transport allowed to them; and where our Colonial Governments actually countenance the unfortunate natives being turned out of their huts to afford their undesired visitors the necessary shelter for the night? Talk of Chinese slavery! here, indeed, is a splendid opportunity for an election cry utterly wasted.

The procedure is, of course, justified on grounds of economy, but is surely indefensible and impolitic from an administrative point of view; and the risks to which it exposes our officers are so great and obvious from our present standpoint of knowledge that it is marvellous that such a system should continue to be tolerated for a single day. To be bitten by infected ticks is, of course, only one of the dangers to which those who are forced to adopt such a repulsive shelter are exposed, as native huts necessarily swarm with malarial mosquitoes, and half a dozen other sorts of parasites of a more or less objectionable character. An order should be promptly issued that officers should under no circumstances sleep in native huts when marching, and proper tents and transport should be provided for them so as to obviate all necessity of resort to so terribly risky a procedure.

THE DEATH OF DR. STEWART.

THE murder, under circumstances of peculiar atrocity, of Dr. Stewart, of the Nigerian Medical Service, is an event that cannot fail to impress the stay-at-home Englishman of the smallness of his knowledge of the conditions of life in an African colony.

To a scientific man, the contingency of being eaten afterwards, is one that adds little or nothing to the horrors of a violent death, beyond perhaps inspiring a grim hope that one may "disagree" with the digestive economy of one's murderers; but that an officer should be actually killed and eaten, not only well within the boundaries of a British colony, but no more than thirty or forty miles from its capital, gives rise to reflections that should give pause to those authorities at home who, though absolutely without local knowledge, have yet the last word as to the administration of these distant colonies. It is true that Nigeria has only come under British rule quite recently, but as a matter of fact, this debased appetite is a common characteristic of most of the tribes of Western and Central Africa; and though fear of consequences would, in the case of a

white man, render such an event extremely unlikely in the neighbourhood of Cape Coast Castle or Sierra Leone, few who know the country would care to deny that cannibalistic tastes are still prevalent, or that, amongst themselves, when safe from the eye of the ruling race, such occurrences are either impossible or even uncommon.

Evidences of cannibalism have been found even in Europe, though it is doubtful if these ancient cannibals were really Caucasians, and with this doubtful exception the Caucasian and Mongolian races have always regarded cannibalism with the horror that should be natural to any race that aspires to survive in the struggle of fitness. At any rate, if ever given to such practices, the white and yellow races abandoned them in the very earliest stages of the evolution of their civilisation, whereas the negro retains them long after emerging from the stone age, and even when he has made considerable advances in agriculture and in the arts of weaving and working in metals.

So inbred, indeed is this savagery, that even after generations of nominal Christianity in the West Indies, the rising in Jamaica, which wrecked the reputation of the much maligned Governor Eyre, was marked by such incidents as the scooping out of the brains of their European victims and the conversion of skulls into drinking cups. The irony of the situation, however, lies in the fact that under our system of administration it is quite possible that the very men who "chopped" poor Dr. Stewart may give trouble to his immediate successors, in the less congenial but more humorous guise of an obstructive village sanitary committee, or some such exotic organisation, based on the latest European models. Surely such an incident shows, *inter alia*, that at any rate in a matter as foreign to his philosophy as sanitation, it is essential that the negro should be ruled benevolently but despotically by the European.

BISKRA AS A HEALTH RESORT.

BISKRA, the desert city, is an agglomeration of oases to the south of the Aurès Mountains which has become a very popular resort during the last few years. It is only 360 feet above sea-level and the climate is delightful for six months in the year. The temperature in the shade averages 60° F. during the winter season (November to May), and rain is practically unknown, the total annual fall not exceeding an inch and a half.

Within the sphere of influence of the carefully husbanded water supply the soil is remarkably fertile and vegetation is exuberant. The oasis of Biskra alone contains a hundred thousand date palms, besides other fruit-bearing trees, and this luxuriance of growth is in startling contrast with the surrounding aridity. There are plenty of objects of interest in Biskra and its immediate neighbourhood. The town, with its 8,000 inhabitants, is a typical example of "life in an oasis."

Abstract.

FLIES AND CHOLERA (*Mouches et Choléra*). By Dr. A. Chantemesse and Dr. F. Borel. 1 vol. in 16. Price 1s. 6d. J. B. Baillière et Fils, Paris, 1906.

Cholera which started from India in 1900, had arrived gradually in the vicinity of Berlin in October, 1905. Has it reached the final limit of its onward march? It would be rash to state so. During the four preceding years cholera has apparently disappeared at the onset of the cold season, but has always resumed its progress in the early days of the following summer. We must therefore be prepared for a fresh extension of this epidemic which hitherto has been uncontrolled, in the first fine days of 1906.

Truly we may face this alternative without much fear, the progress of hygiene having provided us with arms of ever increasing efficiency for combating this scourge. Nevertheless, we have not as yet reached the time when it can no longer be feared. As yet we can only restrict the number of cases; it is difficult, on the other hand, to entirely prevent a manifestation of contagion, and the brutal fact of a contamination may at any time occur.

Drs. Chantemesse and Borel have therefore deemed it of interest to draw up in this small volume a schedule of the latest ideas on cholera collected by science since the last epidemic. Amongst these, there are at least two which appear to us to be specially worthy of notice, as a knowledge of them is of a nature to invite some important modifications in the prophylaxis of cholera. These are *latent microbism* and the *dissemination of the diseases of microbic origin by the intermediate agency of insects*.

A historical review of the several incursions of Indian cholera into Europe between 1817 and 1892 leads the author to the following conclusions. India is the original home of cholera, from which it spreads and reaches Europe by three different routes. The first is through Afghanistan and Persia; the second is by way of the Persian Gulf, Chat-el-Arab, and Persia; the third is that by Mecca and Egypt to the Mediterranean Sea. The progress of the various epidemics has been notably influenced by the amplification of the means of transport and by their ever-increasing ratio of speed. Thus in 1823 cholera did not go beyond the South of Russia. In 1830 and 1848 it took two years to invade the whole of Europe; whilst in 1892 this continent was completely affected in a few months.

Towards the end of 1899 and early in 1900 cholera in India again broke out with great severity both at Bombay and Calcutta; it then proceeded to the south of the peninsula, and thence gradually extended eastward to China and westward to Europe.

On the eastern route it attacked the Dutch Indies in June, 1901, and then in succession appeared in Singapore, Burmah, the Philippine Islands, China, Formosa, Japan, and Cochin China, and with deadly force afterwards in Manchuria and Corea, finally only ceasing its advance to the north on arrival at the end of the inhabited world.

To the west of India three routes lay open, all of

them equally familiar with this scourge. The land route through Afghanistan, the sea route *via* the Persian Gulf, and that through the Red Sea. Which of these three roads would it follow? Briefly stated, cholera, leaving India in December, 1901, reached Hedjaz in March, 1902, contaminated Egypt in July of the same year, and following the Mediterranean coast appeared in Damascus in January, 1903. After reaching Bagdad early in 1904 it passed on and ravaged Persia, and by July had attacked Bakoum on the borders of the Caspian Sea; from here it invaded on one side the Caucasus and on the other the Volga, which it ascended as far as Saratow, from whence it spread through Russia, finally appearing in August, 1905, in Eastern Prussia and in Austria.

In order to arrest the onward march of cholera, and especially if logical barriers are to be opposed to it, this march must be considered under the three following different aspects: its transportation, propagation, and dissemination.

Transportation is its extension from a contaminated country to a distant healthy region; *propagation* is its extension from town to town, or village to village, in a recently infected territory; and lastly, *dissemination* consists of the various methods of which the epidemic avails itself to spread in the same town from house to house, or from one individual to another.

Cholera can be *transported* to a distance only by healthy individuals, in whose intestines specific cholera vibrios may be found, although they themselves show no clinical symptoms of the disease.

Cholera may be *propagated* by the agency of individuals in a state of latent microbism, but also by clothing, &c., infected with choleraic dejecta, within five days, and by individuals in whom cholera is incubating.

Cholera may be *disseminated* in five different ways:—

(1) and (2) By linen and personal effects, if recently soiled by cholera dejecta.

(3) By drinking water, if the contamination can reach the wells, cisterns, or ground water.

(4) The actual patients will infect their surroundings by their dejecta, which represent pure cultures of the dangerous microbe.

(5) Healthy individuals may become a source of contagion for others, as their faeces in many instances will contain the cholera vibrio, which, although not active in their case, may yet become pathogenic for others.

Modern science now entitles us to say:—

In times of cholera, the dejecta of many people are receptacles of cholera vibrios; everything contaminated by these dejecta becomes in its turn a source of danger, so long as desiccation, disinfection, or spontaneous alteration have not destroyed its activity. The multiplication of the cholera microbe takes place in the digestive canal to the exclusion of other parts of the body, but not necessarily manifesting its presence there by any pathological trouble.

The prophylaxis applicable to cholera is, therefore, at once both restricted and yet amplified; it is restricted, since we know that all that is required is to destroy only the fresh dejecta wherever they may

be found; it is extended, since we now know that all dejecta must be attacked, not only in the case of patients, but also those of men apparently in good health.

Now how does the cholera vibrio usually pass from these dejecta into the digestive tracts of individuals living in an infected area? Is it by drinking water? Not necessarily. By inhaling dust? No. Judging by the analogous cases of plague and yellow fever (which are also lessened in number, but not in intensity, during winter), may we not conclude that a similar effect, whilst not affecting the cholera vibrio itself, may, nevertheless, act on the intermediate agent which carries the germ and permits it to penetrate—if not indeed directly, at least indirectly—into the human stomach? Without mentioning the numerous insects which—especially in hot countries—might act this part, can we not find one, in Europe as elsewhere, answering in all points to the description of the intermediary required? We allude to the ubiquitous fly.

Natural history shows that a fly can transport cholera germs in two ways, either as an inert carrier (owing to the vibrios adhering to its feet or any other part of its body, and then being deposited on food), or by means of its proboscis, which retains and preserves the germs and redistributes them successively over different media, which, if favourable for their development, ensures their multiplication, especially if the temperature is also sufficiently high for this purpose. Several series of experiments prove that flies can disseminate cholera, but that this contamination disappears in about twenty-four hours after contact with the source of choleraic infection. We do not assign to flies an exclusive role of disseminating agents of cholera, for other modes have also a certain value. For instance, recently soiled linen may be touched by the hand, which may then touch one's mouth or food, and cholera thus be contracted. Water may become infected by infiltration with faecal matter, and thus become the cause of part of the epidemic. We only here insist on a new method of dissemination which, conjointly with others, permits us to explain more completely the progress of cholera.

The prophylaxis against cholera is divided into several headings: *International, National, Urban, and Individual.*

International prophylaxis against cholera will probably remain an open question for very many years to come.

National prophylaxis can only play a restricted part in the defence against cholera; it can forbid entry on its territory of patients or of freshly soiled linen, but it is practically powerless against individuals in a state of incubation or of latent microbism, and it must delegate the ulterior and rigorous duty of keeping them under observation to the respective municipalities. It is, therefore, to urban and individual prophylaxis that we must look to for successful protection against cholera invasion.

Urban prophylaxis. The cholera microbe resides in the faeces of the sick and in those of many healthy individuals; therefore the urban struggle against the epidemic must consist exclusively in successfully dealing with the excreta, but this task is not one that

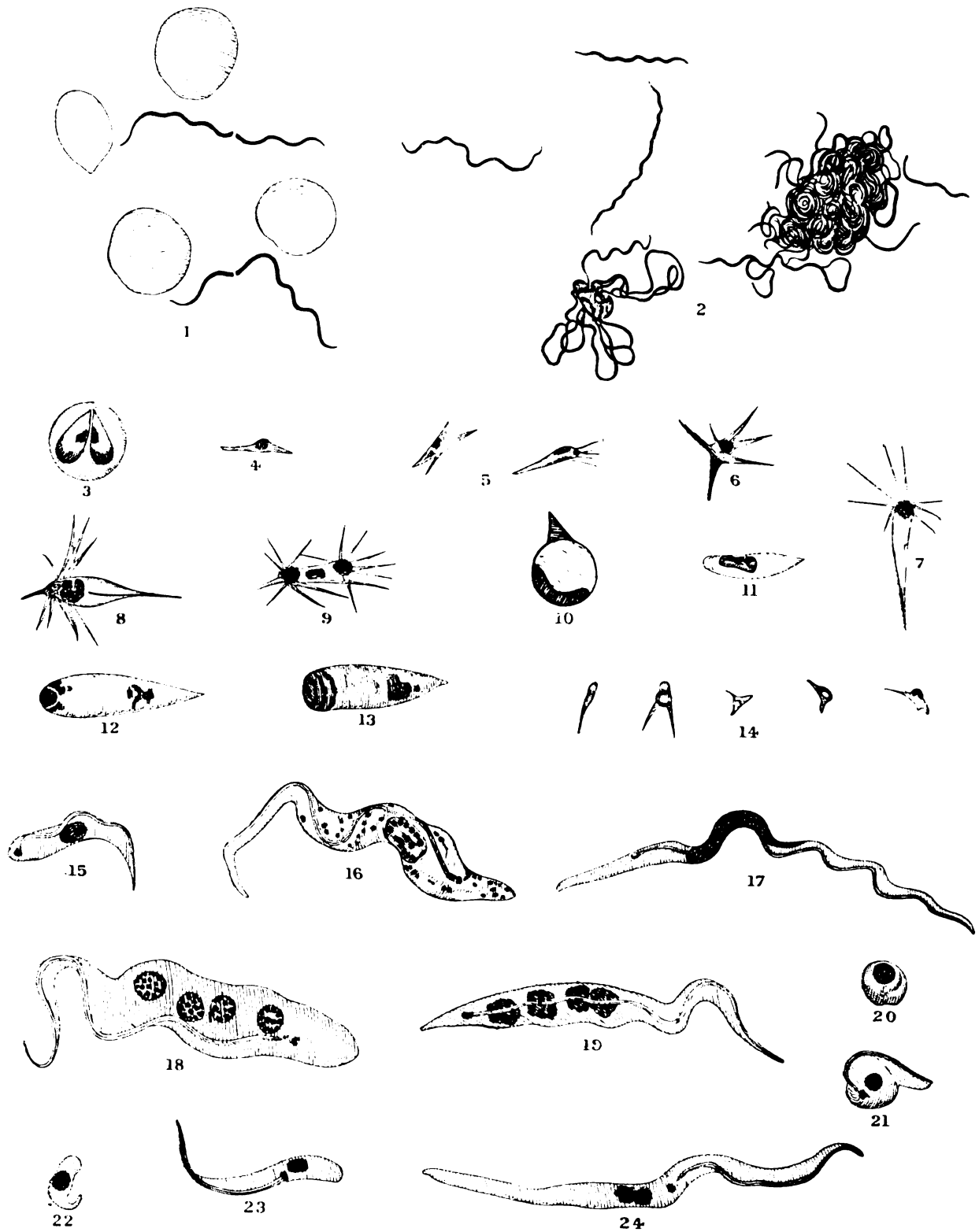
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To illustrate "Preliminary Statement on the Results of a Voyage of Investigation to East Africa." By R. Koch.

can be undertaken on the spur of the moment. The pail system and privies must be things of the past, and no town can cease to fear infection until its system of sewers is in a perfect condition, from its water-closets to its final and distant discharge outlets. Urban prophylaxis against cholera may, therefore, be summed up in a few words: *an incessant, determined and methodical fight against fecal matter, before, during and after the epidemic.*

Individual prophylaxis against cholera depends on two main principles: the prevention of the cholera microbe from entering one's body, and if in spite of all precautions the microbe has found its way into one's digestive tract to prevent it from manifesting its presence there. To accomplish the first aim, the individual should attend not only to his drinking water, but also to his food in general. Water and milk should be boiled, food should be well cooked and served hot, and kept from flies; no food should be eaten which is not cooked at home; flies must be kept down—say, by formol—especially if the water-closets are defective, or if stables and manure heaps are in the neighbourhood. If, in spite of all precautions, the microbe has somehow managed to enter one's body, this latter should be protected from all causes which might bring about any intestinal trouble, such as chills, over-eating, unripe fruit, &c.; in other words, one should keep one's intestinal balance.

As regards the patient, since his dejecta—vomit and excreta—contain the dangerous microbe, everything that has been contaminated by these, or in contact with his mouth or anus, must be at once disinfected. The vessels containing the dejecta must be protected from flies whilst being carried about, their contents must be disinfected—or, better still, burnt, when this is possible—and the recipients then sterilised. The bed and the patient must be placed under a mosquito net, and the vessels which contain his food, drink, or medicines should be enclosed in a wired safe, so as to prevent all access thereto of flies. No meal should be taken in the sick-room, and hands should always be disinfected after touching the patient. In a word, prophylaxis consists in destroying the microbe at the very moment of quitting the patient's body, and before it has had an opportunity of becoming disseminated.

As regards the future, the land route from the East to Europe—the one already preferred by cholera—is about to be largely developed, and the plans have already been drawn up. There will be no protecting deserts, no lengthy sea voyages, during which cholera can be stamped out on board ship. The rapid propagation along the railroads will suffice to bring cholera into Europe every time that it undergoes the slightest recrudescence in the Indian peninsula. Urban prophylaxis alone will be able then to contend against the ceaseless threatening danger; the problem resolves itself into this: *Will the networks of the sewers be everywhere ready before those of the railroads?*

J. E. NICHOLSON.

Translation.

PRELIMINARY STATEMENT ON THE RESULTS OF A VOYAGE OF INVESTIGATION TO EAST AFRICA.

By R. KOCH.

(Translated from the German by P. Falcke.)

In December, 1904, I travelled to German East Africa by commission of the Imperial (German) Government, to institute enquiries as to combating the Coast fever of cattle in the colony, which was said to be widely disseminated. For this purpose it was first of all necessary to confirm the actual spread of this disease in a reliable manner. It is a well-known fact that cattle from healthy regions become affected when they are taken to the infected coast, whereas those animals that are bred there remain healthy. It was accordingly resolved to import cattle from the principal stations of the colony to Daressalem, and to put them out to graze on severely infected pasturages, in order to test their liability or immunity to the disease.

In consequence of the great distances from which the animals had to be driven, it was two to three months before all arrived at their destinations, and I employed the time in the study of relapsing fever. The disease is undoubtedly endemic, but such cases as had been met with had always been mistaken for malaria, and it is only a year ago that the disease has been correctly diagnosed, by microscopical examination of the blood. Once attention had been directed to the disease its frequency was recognised, and investigations as to the cause of its origin were begun, leading to the conjecture that a species of tick might be implicated. I procured a number of these ticks, and succeeded in demonstrating spirochætæ, which appeared to be identical with the spirochætæ of relapsing fever, in some of them. This discovery naturally suggested the necessity of following up the question on the spot, that is to say, on the caravan track. I therefore undertook an expedition in company with Staff-Surgeon Dr. Meixner by the caravan route to Morogoro, a ten days' march.

Soon after our arrival there, we received the announcement by telegraph that cases of a disease, suspected to be plague, had occurred in the Rubeho Mountains, south of Mpapua, and that the outbreak had been preceded by a remarkable mortality amongst rats. This alarming news caused us to travel thither to see if there was an outbreak of actual plague. Fortunately we were able to establish that there had not been a single undoubted case of plague, and that the mortality amongst the rats had nothing to do with plague, but was caused by the larvæ of a gad-fly.

I then visited the Uhehe country, where two years ago a few undoubted cases of plague had occurred, and where recently a suspicious mortality had been observed amongst the rats. In this place also the rat mortality was found to be referable to the same larvæ.

During the march into the interior of the Protectorate I passed through many tsetse-fly localities. This was particularly the case on the homeward march, when I made a detour into the Uluguru Mountains in

order to investigate a rather important centre of leprosy. It had not originally been my intention to undertake any work on "tsetse," but the opportunity was so favourable that I was involuntarily drawn into investigations on the tsetse-flies. This took up a considerable time, but led to interesting results.

On my return to the coast I found that a number of oxen had arrived, and that some of them had already fallen ill with Coast fever and Texas fever. This afforded me an excellent opportunity to continue the investigations I had formerly begun in Rhodesia on the history of development of the piroplasma. In Rhodesia, in consequence of the unfavourable climatic conditions, I had not been able to make much progress, and had only discovered the first indications of a further development of this interesting parasite in the tick. I had now at my service a wealth of material in a climate suitable for the development of the ticks and the parasites they harbour. Here again, was a proof of how greatly the success of such research depends on the correct choice of time and place. This time I succeeded without difficulty in tracing the history of development of the piroplasma to the forms assumed in the ova of the tick.

In addition, I continued my study of the tsetse-flies, and as Daressalem was not very favourable for this purpose, I removed my headquarters to the biological experimental station of Amani, where there is a well-arranged laboratory, and around which the Usambara Mountains furnish extensive tsetse centres for study.

As I gained further rather important results in the course of these observations, I considered it expedient to visit Uganda before my return to Europe to gain personal information on sleeping sickness, and to ascertain in what measure my observations on the glossina of tsetse disease coincided with those on *Glossina palpalis*, the carrier of sleeping sickness.

I give here briefly an outline of the most important observations and discoveries I made in these expeditions, and hope later on to publish a detailed communication on the subject.

RELAPSING FEVER.

The relapsing fever which is prevalent in German East Africa differs in but few particulars from the European form of this disease. The brevity of the individual attacks is particularly remarkable, as also is the small number of spirochætæ discoverable in the peripheral circulation. The African spirochætæ appear to me to be, on an average, longer than the European variety. I have never seen chromatin bodies in the spirilli, which would have presumed their relationship to some trypanosoma; neither did I observe any indications of either an undulating border or of longitudinal division. On the other hand, gaps were frequently seen, which gave one the idea that the parasite increased by transverse division' (fig. 1).

Monkeys could always be infected with certainty by means of subcutaneous injections of "relapsing blood."

¹The plate has been prepared from drawings made by Dr. Kudicke, with Zeiss' drawing apparatus, from the original preparations, and with an enlargement of 2,500, and redrawn in our office, as the blocks illustrating the German original were hardly sharp enough for advantageous photographic reproduction.—Ed. J. T. M.

The disease thus artificially induced ran a severe course, sometimes even terminating fatally. The spirochætæ are more numerous in the blood than is the case in man.²

African relapsing fever is transmitted by the bite of a tick.³ This tick, *Ornithodoros moubata* (Murray), lives in the floors of the huts of the natives. At night it comes out, sucks the blood of the inmates, and again conceals itself in the floor during the day. They are also regularly found in the floors of the so-called *bandas*, or shelters under which caravan travellers pass the night, but only in those parts not exposed to rain. The ticks are probably distributed over the entire Protectorate, and are also found in localities far removed from caravan traffic.

When a tick has sucked the blood of a man or monkey suffering from relapsing fever the spirochætæ do not multiply, but in the course of a few days disappear from the stomach of the tick. If, however, such ticks be examined more minutely it will be discovered that in a certain number of them spirochætæ can be demonstrated on the surface of the ovary. This examination is effected in the following manner: The ovary is squeezed out of the tick, teased out on a cover-glass, spreading it out as much as possible, allowed to dry, and then stained with a solution of azur-eosin. The spirochætæ are then mostly found in such numbers and arrangement that a considerable increase must undoubtedly have taken place. This demonstration is most successful in cases where the ova are in an early stage of development.

After the ticks have deposited their eggs the spirochætæ will also be found in their contents. There are, however, only a few groups of eggs, and in these again only a few eggs which are infected. At first only single specimens or groups consisting of a few, are found in the eggs, later on they are more numerous and often form conglomerations (fig. 2). It therefore appears as if they continue to multiply within the egg. I have not observed any alterations which would lead one to construct a hypothetical cycle of development.

The young ticks from infected localities are capable of infecting monkeys on which they have been applied.⁴

Of the ticks examined for spirochætæ, 5.15 per cent. were usually found to be infected, and in a few cases this number rose to 50 per cent.

Infected ticks were found in all locations on the caravan route from Daressalem to beyond Kilossa, in the direction of Mpapua, and on the track from Kilossa to Tringa. They were also found in the villages of the Rubeho Mountains, and in locations away from the caravan routes.

Neither of the three Europeans who were with the caravan suffered from relapsing fever, because they

²As far back as the end of 1903 Dr. Kudicke succeeded in transmitting African relapsing fever to monkeys.

³During the expedition I was unable to obtain the current literature of the subject, so that it was only later that I heard that that cute investigator, the late Dr. Dutton, had simultaneously infected monkeys with relapsing fever by the agency of ticks. Compare *British Medical Journal*, February 4th and May 6th, 1905.

⁴Hitherto I have succeeded eleven times in this experiment.

never passed the night in native huts, nor did they sleep in the *bandas*. Of the five native servants who observed no such precautions, four were attacked with the disease. Of the sixty carriers, none had relapsing fever, although they slept in huts or under the shelters. This was probably because they had been infected on former expeditions, and so acquired immunity.

Certain observations demonstrate that fever has always been widely distributed and endemic in German East Africa. The natives, as a rule, contract the disease during youth, and consequently acquire more or less immunity, so that they either escape or get only single slight attacks. The European can best protect himself from infection by pitching his tent only on spots which have not been used by others for camping.

Amongst the cattle examined by me in Daressalem I incidentally found that two oxen were suffering from the cattle spirillosis discovered by Theiler. In these animals also, I succeeded in tracing the spirochætae to within the ova of the ticks.

(To be continued.)

Correspondence.

WYTMAN'S GENERA INSECTORUM. 26th Fasciculus. — Culicidæ. By F. V. Theobald.

The above publication may be presumed to mark the termination of the tentative stage of Mr. Theobald's work on the classification of the Culicidæ, and the presentation of his results in a more or less definite and final form, so that it may be opportune to consider how far the proposed classification can be said to fulfil its purpose.

Putting aside the *Corethriniæ* in which the structure of the mouth presents such radical anatomical differences, that, apart from the accidental similarity of their wing venation, no one would have thought of grouping them in the same family with the Culicidæ, it must be premised that the family is characterised by such uniformity of structure that there is no real need for multiplying the number of its constituent genera, apart from considerations of convenience. The difference in the proportional length of the palpi in the two sexes furnished the earlier collectors with the four genera that were alone firmly established when the writer, in 1900, published his compilation of published descriptions of species, but such a number was even then obviously insufficient, as the genus *Anopheles* included thirty, and that of *Culex* no less than 159 names.

Added to this, the hygienic importance of the family led to such great activity in collecting that an enormous mass of material, including some hundreds of new species, flowed into the British Museum, and the most difficult problem presented to Mr. Theobald, to whom the work of classification and examination was entrusted, was to find some plan of reducing the family into genera of more manageable dimensions.

This he believes he has accomplished by the adoption of *scale-structure* as a basis of generic distinction, but it must be confessed that the result is somewhat disappointing, as the genus *Culex* is already more crowded than ever, and now includes no less than 175 species, and is still growing; or, in other words, more than 44 per cent. of the four hundred and odd species enumerated remain crowded together as one of 67 genera enumerated.

Of these 67 genera no less than 52 do not contain more than four species, and 32 of these include but a single species.

In the *Anophelina*, where, not scale-structure but scale-distribution has been mainly relied on, the result is fairly satisfactory, in other words, in four or five of the thirteen or fourteen new genera; but whereas in the *Culicina*, scale-distribution is painfully uniform, the number of genera including but a single species is so large that it is obvious that the characteristics relied on, viz., that of scale-structure, is in no sense of generic, but merely of specific, value; and, even in the *Anophelina* the same result has followed wherever scale-structure alone has been adopted for the distinction of genera.

The net result is that the identification of species would be far easier by a merely artificial system of tabulation, until some characters of better generic value than scale-structure can be hit upon, and this we appear to be as far as ever from discovering.

The fact is that any system which relies on one class of character alone is sure to break down in practice, because classification on such a basis, necessarily results in a grouping as little natural as a frankly artificial tabulation, with none of the advantages of the latter in the matter of ready recognition of species.

Some of Mr. Theobald's genera will no doubt stand, especially his earlier ones; the genus *Stegomia* forming undoubtedly, a fairly defined and natural group of species; and the same may be said of *Mansonia*, through the weakness of scale-structure as a generic criterion must be evident to any one who is at the pains to examine closely the wings of the various species, for why some of these should not be placed in *Taniorhynchus*, if judged by their wing-scales alone, is a matter that is difficult to understand.

Coming to *Taniorhynchus*, it can easily be seen, that while the original definition of Arribalzaga brought together a distinctly natural group, the modified diagnosis of Theobald excludes many obvious congeners and includes a number of undesirable aliens.

Space forbids any further criticism of individual genera, but the above examples should suffice to indicate the grounds that have gradually led the writer to regretfully abandon the use of Mr. Theobald's classification. Nor is he alone, for recent criticism shows that these opinions are shared by those whose position as professed entomologists entitles them to be constituted as judges on such a question.

Six months ago Captain James and Captain Liston, I.M.S., produced their monograph of the Indian anophelina, rejecting Mr. Theobald's classification for much the same reasons as those advanced above, though that work and the critiques on it had not been seen by the writer at the time the earlier portion of this article was penned, the dates being about contemporaneous.

The process of genus making, however, goes on as merrily as ever, for the worst of work of this sort is that it is infectious, and a busy group, including Blanchard in France and Miss Ludlow in America, seem to be conspiring to make the recognition of a mosquito an impossible task, even for naturalists, let alone for medical men. It may be well, therefore, to quote textually the opinions on this subject of two of our best known British dipterologists as expressed in the critiques above alluded to on James and Liston's work.

Mr. Verrall, in the *Entomologist's Monthly Magazine* for May, 1905, p. 121, says: "The writers do not profess to be ultra-scientific entomologists, and thereby show their common-sense, and probably better true science than the genus and species makers who have preceded them. At any rate there remains the fact that their species will be easily and accurately recognised, while the works of Theobald will prove stumbling-blocks for generations. They have wisely ignored the insufficiently distinguished genera of Theobald, which have commonly been founded on minute and practically indistinguishable characters, and which are consequently valueless to the 'field' naturalist."

In another review of the same work, which appeared in the *British Medical Journal*, June 10th, 1905, Mr. E. E.

Austen, if less emphatic, is obviously of the same opinion, as he records his opinion that "For the reasons stated, therefore, we are disposed to agree with the authors in their conclusion that while differences of scale-structure are undoubtedly of great value in the distinction of *species*, such differences as are present, at any rate among Anopheles are not sufficiently important to be considered of generic value."

Once this is admitted, the whole basis of Mr. Theobald's classification falls to the ground, but meanwhile the game of genus making goes merrily on, and each new species that comes to light is made a pretext for the establishment of a new genus. For the genus makers this amusement is doubtless highly satisfactory as a labour-saving expedient; because it is far easier to describe your species and call it a genus than to go to the pains and labour involved in fitting it in to some existing group; but it is quite the reverse for those who are frequently called upon to identify mosquitoes.

At the time of the issue of the second edition of the writer's "Handbook of the Gnats or Mosquitoes" the process had not gone far; and while somewhat distrustful of several of the new genera, the results were in many cases satisfactory and useful, so that, having nothing better to propose, and recognising the urgency of the subdivision of the unwieldy recognised genera, it was felt desirable to fall into line with so authoritative a publication as a British Museum monograph.

The growing complexity of the classification, as further evolved in the third or supplementary volume of the monograph, however, made him feel that any further adoption of the classification of the monograph would be a distinct mistake in a work primarily intended for the use of medical men, so that, in issuing his "Revision of the Anopheline," while employing Mr. Theobald's new names, the writer declined to employ his genera as a key to the recognition of species, feeling that neither he nor his readers could be trusted to sort out mosquitoes by the plan proposed. The memory of prolonged helpful correspondence and pleasant days of work together made him loth to bring this disapproval more prominently to notice, but the rapidly increasing rain of new genera is bringing such utter confusion to the subject that he feels it incumbent as one who, if not a professional naturalist, was yet the first to take up the subject systematically, to add his voice to the protests of those far better qualified than he to judge on such points.

G. M. GILES.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"The Australian Medical Gazette," December 20, 1905.

AN EPIDEMIC OF ACUTE DYSENTERY OCCURRING AT RUTHERGLEN. J. R. HARRISON.

In Rutherglen, a town on the Murray River, Victoria, Australia, an outbreak of dysentery began on January 22nd, and lasted until June 6th, 1905. During this period 53 cases of typical dysentery were seen and treated by Dr. Harris, who reports the epidemic.

Of the 53 cases 7 were observed in children from 6 months to 2 years old, with four deaths; 11 cases occurred in children from 2 to 8 years old, with

no deaths: the remainder occurred at ages varying from 15 to 79 years, and of these three were females, aged respectively 20, 22, and 27 years, and one male, aged 79, died.

Dr. Harris found treatment by bismuth, opium and mist. creta, ipecacuanha and pulv. ipecac. Co. and calomel, useless in the severest cases. He gave up these drugs in favour of Epsom salts, which he prescribed as follows:—

R Mag. sulph.	...	...	...	grs. xxx.
Acid sulph. dil.	...	...	...
Tinct. belladonnæ	...	...	...	aa ℥x.
Liq. opii sedat.	...	...	...
Liq. strychniæ	...	...	...	℥v.
Aq. piperitæ	...	...	...	ad. ʒi.

One ounce every three hours.

This mixture acted immediately, and the results obtained were "all that any one could desire."

The cause of the outbreak was attributed to the water supply, which is laid on unfiltered from the Murray River, but analysis has thrown no light on the water being the source of infection.

The bacteriological results of the stools and of the blood showed:—

- (1) No Shiga bacillus in the stools.
- (2) A para-typhoid bacillus was present in excess of the common faecal colons.
- (3) The patient's blood yielded a positive agglutination reaction to the above bacillus, suggesting a causal relation between the bacillus and the dysentery.

"L'Europe Coloniale," December, 1905.

UN MISSION A LANG-BIAN. DR. VASSAL.

The author gives a vivid picture of the difficulties with which a doctor has to cope when working among semi-civilised people. The Annamese hiding themselves, or only consenting to have their children vaccinated when bribed with beads and tobacco; and it was only by availing himself of ostensibly chance scratches when vaccinating that he could get sufficient specimens of blood to establish the malarial index of the population. Two types of parasites were found—malignant tertian and the benign tertian—and 64 per cent. of the natives were affected. Dr. Vassal appears surprised to find malaria at Celoa in Reunion at a height of about 3,800 feet, but as a matter of fact, such an elevation is quite insufficient to affect the question in ordinary tropical or sub-tropical climates.

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

RHINO-PHARYNGITIS MUTILANS (DESTRUCTIVE ULCEROUS RHINO-PHARYNGITIS): A PROBLEM IN TROPICAL PATHOLOGY.

By JAMES FARQUHARSON LEYS, M.D.

Surgeon, United States Navy.

It is the purpose of this paper to call the attention of the profession to a pathological condition which prevails in only a few limited areas in the world, so far as known. This condition may, perhaps, be a late stage of frambæsia or yaws, or a sequel of that disease; or it may be a peculiar manifestation or a sequel of some other known or unknown constitutional disease. On the other hand, it may be a localised special affection, independent of any other disease, a disease peculiar to itself and caused possibly by a fungoid or bacterial invasion.

To introduce this subject to the reader's attention I cannot perhaps do better than quote at length from my annual report, as senior medical officer in the Island of Guam, to the Surgeon General of the Navy, for the calendar year 1904. The quotation follows:—

"*Rhino-pharyngitis mutilans*. (Destructive ulcerous rhino-pharyngitis). We have a disease to deal with which no one of us or of our predecessors has understood. We have no name for it except the descriptive one which I here propose. Many cases of it in the remoter pueblos and in the country have not been seen. The disease, early in its progress, affects the quality of the voice and in an advanced stage renders the face repulsive, so that many of its victims avoid public notice. Between forty and fifty cases have been seen, treated, and studied as long as they could be kept under observation. Many others are known to exist that will not present themselves for treatment. It is estimated that there are from 100 to 150 cases in the island. Among those seen regularly one case aged 3 and one aged 4 died, and another aged 9 was carefully observed and treated for several months, and was improving steadily, when she left Aqaña for Merizo. These three have been the youngest cases seen. The rest are of all ages up to eighty years.

"It is not unusual for a casual visitor here, even a medical one, to remark: 'You have leprosy here, don't you? I met a leper as I was coming up the road.' We can assure such an one that we have segregated all the known cases of leprosy in the island, and believe we have them all. He has met one of our noseless victims of rhino-pharyngitis.

CLINICAL SIGNS AND SYMPTOMS.

"The usual history of a case of this disease is as follows:—The patient, if seen early, as few are, complains of sore throat. On examination an ulcer is seen on the back of the pharynx, on a posterior faucial pillar, or on the free edge of the palate. It is superficial, movable, covered with a thin, dirty, brownish-grey pellicle of slough. This appears to be the initial lesion. The pellicle breaks down and leaves an ulcer which steadily increases, advancing up the throat into the posterior nares. The disease

begins in the soft parts, but after reaching the soft palate and eating its way through its entire thickness, attacks the bone of the palate and nasal septum, finally destroying these entirely. The disease usually arrests itself at this stage, the ulcers healing, and leaves the victim with no septum, the nasal cartilage and skin fallen in, and the nose and mouth one large cavity. The disease rarely, if ever, advances downward from its starting point. The larynx is unaffected and phonation remains perfect, though articulation and the quality of the voice are sadly deranged, as in a bad case of cleft palate. In a few of the cases, fewer than 10 per cent. of them, the process is not arrested at this stage, and the ulceration destroys the cartilage and skin of the nose and advances upon the face. The upper lip always remains as a bridge across the large opening in the face; but above it, through the anterior nares, one looks into the mouth and down the throat. The tongue is unaffected.

GEOGRAPHICAL DISTRIBUTION AND ETIOLOGY.

"The disease certainly appears to be of an infectious nature. The process is somewhat amenable to local surgical and antiseptic treatment, with tonics and iodides. But the infection is very difficult to eradicate, and though the process be apparently arrested for a time it tends to recur till it runs its course. Throughout the active stage of the disease, which sometimes lasts months or years, the patients, if so in the first place, remain muscular, well fleshed, and well blooded; their condition being thus in marked contrast to the anæmia and debility which accompany tuberculosis and secondary syphilis. It thus seems to be local, not constitutional, and this suggests that its cause may be of a fungoid nature.

"This disease appears to be known only in some of these islands of Polynesia. It is reported to be common in the Carolines. The local practicante here, an educated Filipino, practised five years in the Carolines before coming to this island. He holds a Hutchinsonian theory of his own that the etiology of the disease may be connected with the eating of rotten sun-dried fish, of which the Caroline Islanders are fond. The Chamorros of Guam have the same weakness. Dr. Daniels, of Fiji, quoted by Manson,¹ definitely excludes syphilis from its etiology, and thinks it may be a sequel of yaws. Dr. Alvarez,² of Honolulu, has expressed the opinion that it is syphilitic and has no connection with leprosy. In an allusion made to the disease in a report to the Governor of Guam in March, 1902, Surgeon Arnold, of the Navy, says he is not at all inclined from what he has seen of the disease to ascribe it to syphilis.

"The disease has been assumed by medical newcomers and casuals here to be a form (1) of leprosy, (2) of hereditary syphilis, (3) of tertiary syphilis, or (4) of tuberculosis, or (5) a sequel of yaws. There are good reasons for believing that it is none of these, but a peculiar, independent disease. I shall attempt to summarise these reasons.

¹ "Tropical Diseases," London, 1903.

² Personal letter to Surgeon W. F. Arnold, United States Navy.

(1) "*Argument against Leprosy.*—Only visitors not familiar with leprosy itself have ever thought that it was leprosy. Lepers are not known to suffer from this peculiar form of destructive ulceration and from its effects throughout life, and from no other sign or symptom of leprosy. Leprosy is sufficiently common all over the tropical world where this disease is not encountered.

(2) "*Argument against Hereditary Syphilis.*—It appears in healthy and well-developed persons of all ages, with no signs of hereditary syphilis in their own persons or in their brothers and sisters, and with no signs of syphilis in their parents.

(3) "*Argument against Tertiary (Acquired) Syphilis.*—Acquired syphilis is a common disease in most races over nearly the whole world. It is an extremely rare disease here, and neither primary or secondary syphilis has been seen in a native during the past year, among thousands of persons treated for other diseases, including several prostitutes. This disease is common here, and rare or unknown where syphilis is common. Dr. Daniels, who was in Fiji for years, states that there was no syphilis in Fiji at a time when the lesions observed in this disease were common. The appearance of the primary lesion of this disease in otherwise healthy children of healthy parents, at 3, 4, and 9 years of age, excludes acquired syphilis.

(4) "*Argument against Tuberculosis.*—The victims of this disease have no signs of tuberculosis in other organs or parts. The disease does not extend downward and become laryngeal. Instances are observed of several members of the same family all afflicted with only the peculiar lesions of this disease. Tuberculosis is common here as everywhere, and presents the same lesions here as elsewhere in the world. This disease is confined to a very small part of the world, so far as known.

(5) "*Argument against its being a Sequel of Yaws.*—Yaws is a very common disease in the tropical world. It is common here. About thirty cases have been seen during 1904, seventeen of them in school children (as noted above in this report). While a few of the cases of rhino-pharyngitis give a history of yaws, fewer still show any yaws marks or scars, and the large majority deny a yaws history. None of the three cases of children of 3, 4, and 9 years showed any evidence of having had yaws, and I think none of them had had it. The girl of 9 was a particularly handsome child, with a beautiful unmarked skin. Yaws is a very common disease among the negroes in the West Indies, but no sequel of yaws which resembles this disease is reported there. I have heard that yaws is common and this disease unknown in the Philippines. While it may or may not be true that in every place in Polynesia where this disease exists yaws also exists, yet there are many places where yaws exists and this disease does not. We are ignorant of the etiology of yaws, as we are of the etiology of this disease, and we have no reason, that I can see, to assume that they have the same etiology. I can see no evidence to warrant the assumption that this disease is a sequel of yaws.

"The study of this disease offers a fine field for the labours of any school of tropical medicine which might be disposed to send an investigator with a good equipment to this island."

This long quotation has been made as the best means of bringing this subject to the attention of readers to whom the condition may be as new and strange as it was to me when the above was written. My annual report on Guam, from which the quotation is taken, and of which it forms but a small part, was written under pressure for speed within the ten days following an unexpected detachment from that station by telegram. The part referring to this disease, which I have quoted here, was a hurried attempt to portray this condition, which was to me and my colleagues in Guam a pathological novelty, to the clinical and statistical aspects of which I had intended to devote special attention during the following year had I remained on duty there. During my Guam service no literature on this subject was available for reference except the very brief allusion to it in the article on yaws in Manson's *Tropical Diseases*. Some comment on it, with explanation and modification of some of the statements contained in it, is now in order.

The reference made by Manson to the opinion of Dr. Daniels is not by direct quotation. Manson's statement¹ is: "Daniels says that in Fiji, where syphilis is unknown among the natives, these destructive ulcerations of palate and nose, together with a skin affection like lupus vulgaris—all of which he says are amenable to potassium iodide—are not uncommon; he is inclined, therefore, to regard them as true sequelæ of yaws." I have since had access to some of Dr. Daniel's reports on this subject and will give his views in his own words. First, from an essay on this subject written jointly by J. S. Wallbridge and C. W. Daniels,² I take the following statements referring to Fiji: "There are a series of pseudo-syphilitic phenomena met with in the natives, *thought by some to have a connection with yaws*. Syphilis is unknown among the natives. First among these there is a destructive ulceration of the soft palate and fauces and sometimes of the nose. . . . I have twice seen this ulceration under 10 and it is common about twenty. In rarer cases it occurs late in life, and in one woman about 60, on whom I made a *post mortem*, the larynx was involved; there were no tubercles in any of the organs and neither gummata nor other signs of syphilis were present." "That syphilis is unknown amongst the Fijian natives is the experience of every medical man in that group."

Daniels,³ writing later of yaws as he saw it in Georgetown, British Guiana, makes the following statements: "My experience of yaws has been gained mainly in Fiji. There it is called by the natives 'Coko,' and there can be no doubt that it is identical with the yaws I have seen in British Guiana." "Various ulcerations of the pharynx are met with later in life, and are *by some thought to be the sequelæ of yaws*." "The chronic pharyngeal ulceration *attributed to yaws* appears much later than the eruption, and I think is doubtfully caused by that disease." The clauses which I have italicised in these quotations give quite a different impression as to Dr. Daniels' views

¹ *Op. cit.*

² "Selected Essays and Monographs," New Sydenham Society, London, 1897.

³ *Brit. Jour. Dermat.*, London, 1896, viii., 426.

from that which I had derived (rightly or wrongly) from the reference to them in Manson's book, quoted just before. Dr. Daniels evidently considered that there was little ground for the assumption that this pharyngeal-palato-nasal condition is a sequel of yaws, or at least he appears to have considered it only an assumption unsustained by any proof. His view would appear to be very much the same as my own.

My reference to Dr. Alvarez, of Honolulu, as holding a belief that these lesions are syphilitic is misleading, and I must correct the wrong impression it might give. I do not know that Dr. Alvarez has ever seen this condition in Fiji, Guam, or any other place in Polynesia. Surgeon W. F. Arnold, one of my predecessors in Guam, impressed by the prevalence of these lesions there, wrote to Dr. Alvarez, at Honolulu, asking him if these lesions were seen there, and if he believed them to have any connection with leprosy. Dr. Alvarez's letter in reply was left on the medical file at Guam, where I read it. His reply to this point was, in substance, that a few people were to be seen among the Hawaiians whose palates and noses had been destroyed by disease, that the lesions were not leprosy, and that he regarded such cases as were seen in Hawaii as probably tertiary syphilitics.

In the "Argument against Tuberculosis" I have stated that the disease "does not extend downward and become laryngeal." This is a rule which, like most other medical rules, must admit an occasional exception, as in the one case referred to in the essay of Drs. Wallbridge and Daniels, and quoted above.

In the argument against its being a sequel of yaws, I said: "Yaws is a very common disease among the negroes in the West Indies, but no sequel of yaws which resembles this disease is reported there." This statement was made in ignorance of the literature. As already stated, at the time when this report of mine was written I had not seen any reference to such a pathological condition as the one under discussion except the allusions to it in Manson's chapter on yaws, which I have already mentioned and partly quoted here. I had travelled extensively in the West Indies, had a personal acquaintance with several medical men in the islands, had often discussed professional subjects with them, and I had never heard such a condition mentioned. I had supposed that Dr. Daniels was the first to call attention to it.

Similar lesions, however, similarly assumed to have a connection with yaws, were briefly mentioned by Dr. James Maxwell,¹ in 1839, as having been observed by him in Jamaica.

Certain indolent nose and throat lesions were described by Professor Breda² as having been observed by him in Italy in the persons of three Italians who had emigrated to and returned from Brazil, which lesions Professor Breda assumed to be due to a frambœsial infection. From his description of these lesions, however, and from the coloured plates accompanying his article, it would appear that the conditions seen and reported by him were entirely different from that described by Dr. Rat in Dominica, by Dr. Daniels in

Fiji, and by myself in Guam. In the personal and clinical histories of these three cases, moreover, Professor Breda gives no facts sufficient to connect them with yaws, a disease of which he had only heard and never, himself, had any professional experience.

Lately I have access to Dr. J. Numa Rat's admirable treatise on Yaws,³ published in 1891, in which the author describes these naso-pharyngeal lesions, which he regards as belonging to a tertiary stage of yaws.

After the report of the Surgeon-General of the Navy, containing a part of my Guam report, had gone to press, I requested the proof-reader to strike out the statement I had made that no such condition as this had been reported in the West Indies. In Dr. Rat's treatise (1891) the author says:—

"Destructive ulceration of the nares, pharynx and soft palate is one of the later manifestations of yaws. The affection generally begins as a tubercle at one of the parts above mentioned. When it originates in the nose, the early symptoms are those of ozæna; and the ulceration spreads from this organ to the palate and pharynx. It often, however, avoids the nares and commences in the soft palate. The ulceration of the tubercle extends thence, destroying the uvula and velum palati, and the septum nasi, and deeply scoring the pharynx.

"This ulceration may occur twenty years after the last traces of the secondary symptoms, even though the disease had lasted a short time only, and had been apparently effectually expelled from the system, and though the patient may be robust and in apparently good health. It generally begins about the age of puberty in those cases in which the earlier symptoms occurred during childhood; but it may also commence in childhood, and soon after the secondary period.

* * *

"After a week the patient either develops the symptoms of ozæna, or complains of sore throat. On examination, the tubercle may be readily detected in the anterior nares, or a mirror will reveal the tubercle behind the uvula. After about a month ulceration begins; and, in a month or six weeks more, the uvula, velum palati and septum nasi have disappeared, and the pharynx is deeply grooved and covered with a greenish-white tenacious secretion.

"The ulceration usually ceases about the palate after destroying the uvula and velum palati; but it usually lingers chronically about the posterior nares and pharynx.

"Adhesions may occur between the velum palati and the pharynx, and the posterior nares may be blocked by an excessive growth of granulation tissue, which may also project downwards as far as the œsophagus, leaving a very narrow passage by which respiration and deglutition are performed with great difficulty.

"The percentage of those attacked with the milder form of this ulceration is considerable in some localities in which yaws is endemic. In a district with a population of about 2,000, sixty persons thus afflicted have come under my notice, and possibly many more in the same place were similarly afflicted. It appears to

¹ "Observations on Yaws." Prize Essay. Edinburgh, 1839.

² "On Brazilian Framboesia or 'Boubas.'" *Archiv f. Dermat. u. Syph.*, 1895.

³ "Yaws; Its Nature and Treatment." London: Waterlow and Sons, 1891.

be specially prevalent in certain parts and rare in others.

"The above figures refer to a certain quarter of the windward district of Dominica, in which it is exceedingly common, and to which it seems to be entirely limited in that island. It is, on the other hand, very rare in South America and the West Coast of Africa, where comparatively few cases came under my observation."

I have not observed any lesion in the nose or throat, either in an early or late stage of this disease, which could be described as a tubercle, nor have I seen the excessive growth of granulation tissue interiorly which is described by Dr. Rat.

In far-advanced and aggravated cases I have seen such granulation tissue externally on the face, on the conjunctivæ, in the eyelids, and in the ulcerating alæ of the nose. It is shown in the eyelids in the accompanying photograph of one of the Guam cases. The only inflammatory process I have seen inside is the



serpiginous ulceration of both soft parts and bone, and the narrowing of the pharynx in some of my cases was brought about entirely by the adhesions and scar-contractions described by both Dr. Rat and myself. With these exceptions noted, his description of the local pathological process and mine are quite similar in all essentials, and I cannot doubt that the condition he describes as so prevalent within a limited area in the island of Dominica is the same that I have seen in Guam.

Manson¹ says: "Corney, in his annual statistical return of the Colonial Hospital, Fiji, 1896, classifies eleven cases under the heading 'Lupoid Ulceration of Posterior Nares and adjoining Pharyngeal Parts (tertiary frambœsia)'" Surgeon J. C. Pryor, United States Navy, informs me that when he visited Fiji in December, 1899, Dr. Lynch showed him several such cases as "tertiary yaws." From these statements I infer that the assumed connection between this serpiginous ulceration of the naso-pharynx and yaws has

come to be quite generally accepted by medical men in Fiji.

In December, 1905, I had the pleasure of becoming personally acquainted with Dr. Rat, in the course of a visit to the island of Nevis, where, as an officer of the Colonial Medical Service, he is at present stationed. I submitted my own observations and views on this subject, as contained in my Guam report, to him, and we discussed the subject at some length. Dr. Rat is one of two medical officers in Nevis, and has his residence in the district known as Gingerland.

In Dr. Alfred Nicholls' "Report on Yaws in the West Indies," C. R. Edwards is quoted as having reported the existence of between 300 and 400 cases of yaws in Nevis in 1886; and it was stated for January, 1889, that "in that part of the island known as Gingerland there are probably several hundred cases." As Gingerland is one of several medical districts in the island, and as the total population of the island at that time was given as 13,087, it will be seen that when that statement was written sixteen years ago yaws was excessively prevalent in the Gingerland district, and it is evident, too, that the disease has been generally prevalent in the island for at least twenty years past. Dr. Rat states that it is still excessively prevalent in the island. Dr. Rat was in charge of the limited area in Dominica which has been already referred to, and in which he observed this destructive rhino-pharyngitis to be so common for a period of only eighteen months, and in that short time sixty cases of such lesions came under his observation. At the time I visited him he had been one year in the neighbouring island of Nevis, yaws being excessively prevalent there and having been so for many years. In that one year he had not seen a single case of these naso-pharyngeal lesions in the island of Nevis; and this notwithstanding that the population under his observation in Nevis is much larger than that of the limited district in Dominica in which the rhino-pharyngitis was so common; and that yaws is about as prevalent in the larger Nevis population as it is possible for it to be in any population, and it has been so prevalent, excessively prevalent, there for at least twenty years. Dr. Rat told me that he based his belief that the destructive rhino-pharyngitis of the Dominica district was connected with yaws, was a late or tertiary development, or a sequel of yaws, entirely upon the coincident prevalence of this rhino-pharyngitis in a place where yaws was an excessively prevalent disease. The assumption had, or has, no other basis, and, if I understand his present attitude on the question aright, he feels that such an assumption can be only a tentative one.

RHINO-PHARYNGITIS AND YAWS NOT COINCIDENT.

If, in the absence of any exact knowledge of its etiology, the prevalence of this peculiar destructive rhino-pharyngitis were coincident with the prevalence of yaws, the assumption of a connection between the two would have a fair basis of probability. But from the facts here set forth it does not appear that there is any such coincident prevalence. The very few spots

¹ *Op. cit.*

¹ "Report on Yaws," by H. A. Alford Nicholls. London, 1894.

in the world, only three or four in number, from which we have reports of the striking prevalence of this rhino-pharyngitis are all in the tropics, and all happen to be in regions where yaws is common. But in all of these regions tuberculosis is common; in all but one, Fiji, syphilis at least exists, and the prevalence of this disease is no more coincident with the prevalence of yaws elsewhere than it is coincident with the prevalence of tuberculosis and syphilis elsewhere.

It may help the European reader to realise the extensive and striking prevalence of this rhino-pharyngitis in the few limited regions from which it is reported if he will apply the figures representing its prevalence in Guam (1 to 1.5 per cent.) or in the Dominica district referred to by Dr. Rat (3 per cent.) in some populations with which he is familiar. Any single case presenting similar lesions in Europe would probably be put down to tuberculosis or tertiary syphilis. But only a very trifling percentage of the syphilitic or of the tuberculous present such destructive lesions of the palate and nose, and the percentage of the total population so affected is insignificant. Suppose, however, the general prevalence of tuberculosis and syphilis and the occasional occurrence of lupoid and tertiary syphilitic nose destruction to be just as they actually are in London and other large cities and towns throughout England. And suppose that in Liverpool alone 3 per cent. of the total population were afflicted with a destructive and mutilating serpiginous ulceration of the naso-pharynx, usually self-limited and having little or no effect upon the general health. In the population of Liverpool some 25,000 persons so afflicted would be at large. And if these lesions were attributed by anyone to tertiary syphilis, we would ask why syphilis should bring about such a state of things in Liverpool and not in any of the neighbouring towns where it is equally prevalent. The percentage of the Dominica district applied to the population of London would give us 180,000 persons with peculiarly mutilated throats and noses at large in the metropolis, a condition of things which would attract some attention, and lead to efforts to ascertain its cause.

At the time I write, January, 1906, after a year's reflection on this subject, I am not inclined to modify materially the opinions expressed a year ago in my Guam report. I think this condition presents a problem in tropical pathology which deserves investigation, that no evidence has yet been adduced to warrant our regarding it as a late manifestation of yaws or of any other constitutional disease, but that it is more probably a peculiar and independent local disease. I think that it may not improbably be caused, like blastomycetic dermatitis, or like madura foot, by the local invasion of some infecting organism, though I am far from wishing to advocate this or any other mere hypothesis as to its etiology.

H.R.H. the Prince of Wales opened a new medical school at Lucknow during his visit to that town.

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THE

Journal of Tropical Medicine

FEBRUARY 15, 1906.

THE PROBLEM OF MEDICAL AID IN SEMI-CIVILISED COUNTRIES.

POVERTY, nationally speaking, if not of the individually biting sort, is a common characteristic of incomplete civilisation, and it naturally follows that countries in this stage of development cannot afford to pay for the services of the fully-trained medical product of advanced civilisation in numbers at all adequate to meet the total demand of their population for medical services.

Half a loaf is, however, proverbially better than no bread, and to at least partially meet the necessities of the case there arises the need for the organisation of a lower and cheaper grade of professors of the healing art. It is only lately that the plan has been abolished in France, and traces of it still remain in our English medical titles, if not in actual practice; while in Russia it is a present fact, but for which the medical examination of that Empire would be even more incomplete than it is.

But if, throughout the enormous temperate regions occupied by the Anglo-Saxon race, there is fortunately no longer any need for an inexpensive makeshift of this sort, it is by no means the case in the even vaster portions of the British Empire, where the white man rules and directs, but cannot colonise in the true sense of the word. "Exeter Hall" may rave in its fanatical ignorance, but is powerless to check the instinct of exploration; and once the white man has gained a footing within savagedom he can no more help ruling than oil can avoid floating in water.

Amongst the first in the field, medical men are always to be found, and their services are always so thoroughly appreciated by the indigenous races that their work forms one of the surest and most effective agencies in reconciling the native to the yoke of civilisation.

The demand for skilled medical aid soon, however, becomes far beyond the scanty financial resources of races which are but taking their first lessons in the arts of modern civilisation, and it becomes an urgent necessity to supplement the supply by training locally an inferior grade of practitioner, which, if not educated up to the standard demanded in older and richer civilisations, is yet capable of doing excellent work under more skilled supervision, and of forming an invaluable agency for the promotion of health and civilisation.

In India this need has long been recognised and catered for by the formation of a distinct branch of the medical service, known as Hospital Assistants. The members of this service are usually drawn from families of good caste, and in small but increasing proportion are sons of soldiers in the native army, a status which counts for a good deal in India.

They go through a three years' course, conducted in their own language, by professors who have graduated in our Indian Universities, working under the superintendence of an European superintendent belonging to the Indian Medical Service, but who, unfortunately, has usually so many other duties that it is impossible for him to take any real personal share in the work of teaching.

The course is quite gratuitous, the students even receiving a subsistence allowance; and on its successful completion they are drafted into the civil or military branches of the medical organisation according to requirements.

The training is an extremely practical one, and if not exactly scientific practitioners, the men who have undergone it have learnt enough to deal with all ordinary emergencies in quite effective fashion, and, in point of fact, form the very backbone of the great and somewhat complicated mechanism for popularising modern science in India; for it is the Hospital Assistants in charge of the little "branch dispensaries" which are dotted everywhere over the country, who represents medical enlightenment for the great bulk of the people. He may know nothing of the communications of the cranial nerves, or of the significance of the tendon reflexes, but he has a good working knowledge of the whereabouts of the great arteries, and may be trusted to treat you for fever or dysentery intelligently and efficiently.

Many, of course, become a great deal more than this by qualifying themselves to read and understand

English books, and by observing the practice of their European superintending officers, so that some of them are excellent operators and very sound practical physicians.

In the military branch they now very properly rank as native officers, and very often the grey-bearded old senior assistant is the father of the regiment, and one of the most respected members of the corps.

The success of the Hong Kong Medical School, which we comment on elsewhere, though, of course, it aims at a fuller training, is a good example of what can be done in this direction, and will, we hope, draw attention to the desirability of instituting a similar organisation for the purposes of our African colonies. British Tropical Africa rivals India in area, and now that we are beginning to effectively open up the resources of the back-country the need of a body of medical officials of the type indicated will become increasingly apparent.

Fortunately, our old-established settlements on the West Coast can supply us with an ample number of educated and intelligent Africans to form the *personnel* of such an establishment, so that all that is needed is the mechanism for their education.

For this no elaborate arrangements are necessary, as no costly laboratories and apparatus are either needful or desirable.

The first year should be devoted to teaching visceral and regional anatomy, rudimentary physiology, and enough of the elements of chemistry to make the instruction in dispensing intelligible; while the remaining two years should be given up to the practical work of the profession.

Nor would any large teaching staff be required, as a couple of whole-time professors—one a young officer fresh from home, and the other an experienced Colonial surgeon—would amply suffice, though doubtless, as the school progressed, it would be desirable to strengthen the staff by utilising some of the best of the trained men as demonstrators and assistants.

We are not so sanguine as to hope that such an idea is likely to be acted upon at present, but put it forth in the hope that it may be considered and elaborated in due time by those who are entrusted with the medical organisation of our African Colonies.

AN EXPERIMENTAL REPRODUCTION OF AMOEBIC DYSENTERY BY INTRAVENOUS INOCULATION OF PUS FROM A HEPATIC ABSCESS.

By Surgeon-Major A. GAUDUCHEAU.

Director of the Vaccine Laboratory of Tonkin.

It is well-known that abscess of the liver is often a complication of dysentery in warm climates, and although our knowledge of the pathology of these infections is still very incomplete, it appears that these diseases are due to amœbæ. In a recent work L. Rogers was able to trace the parasite from the intestine to the liver. Nevertheless, the amœboid nature of hepatic abscess has not yet been entirely elucidated, as the experimental reproduction of this lesion has not been realised.

Dr. Gauducheau therefore tried an experiment on new lines.

He obtained some fresh hepatic pus from an European patient. The pus was not sterile, as is often the case, for he was able to isolate three forms of bacilli from it, (1) the pyocyanic one, (2) a bacillus 3 μ in length, which he would have identified as Shiga's had it not been for its marked motility, and (3) a liquefying bacillus. He made an emulsion of equal parts of pus and salt water, and injected 4 cc. of the mixture into a mesenteric vein of an adult native dog. After an incubation period of 4½ days the animal (which had shown no sign of intestinal trouble up till now) was seized with characteristic dysentery. During the three first days after the onset of the illness the fæces contained numerous amœbæ, 20 μ long, moving with rapidity; they then became more rare, and during the last few days that the animal lived could not be found at all; the motions remained numerous throughout, but towards the end consisted almost entirely of pure blood. The animal died on the eighth day.

The *post mortem* showed the whole of the mucous membrane of the large intestine scattered over with bright red spots, in confluent patches or isolated, surrounded by a small inflammatory zone, but without any ulceration whatever; the line of demarcation was very noticeable, the diffuse inflammation suddenly ceased at the cæcum. The rest of the intestines were quite normal, as were also the other viscera.

In a word, whilst trying to reproduce abscess of the liver by a portal injection, Dr. Gauducheau obtained amœboid dysentery. Although the only one up to date, this experiment demonstrates the convertibility of the infection of suppurating hepatitis and dysentery.

Hanoi, December 1st, 1905.

THE post of Residency Surgeon in Kashmir is almost the only appointment in the hills open to medical officers attached to the Indian Political department.

In place of the "malarial focus," where he usually has to put in his time, the holder finds himself in one of the most delightful of climates; and as a change to the usual hard work of practically administering all the medical institutions of a native state, his duties are purely advisory and correspondingly light; though far from a sinecure, in view of the number of health-seekers who now annually invade Kashmir. Under these circumstances the post has been very properly regarded as an exceptional one, which should be reserved for men whose health had suffered from the arduousness of service in the ordinary political posts, as it affords an opportunity, advantageous alike to the individual and the state, for an officer to recover his health without the expense of taking or giving furlough.

Recognising these facts, it was officially laid down in the time of that admirable administrator, the late Surgeon-General Harvey, that the appointment should not be tenable for more than five years, and there can be no possible doubt as to the wisdom and fairness of

the order, though the period might perhaps have been curtailed to two or three years with advantage to the Service.

We hear, however, that this wholesome rule is to be abrogated in favour of the present holder of the appointment, who is to be allowed to hold it indefinitely.

It may be admitted that the officer in question has an exceptionally brilliant record, but there are other ways of rewarding and of utilising his talents than that of consigning him permanently to this Indian Capua, and we trust that should this meet the eye of the Secretary of State for India he may enquire into the matter, and should there be any foundation for the rumour, place his veto on what might be described by ill-natured people as something very like an instance of "influence."

THE COLLEGE OF MEDICINE FOR CHINESE, HONG KONG.

WE are pleased to gather from the Calendar for 1906 that this College thrives. No fewer than thirty-five students are in attendance, and since 1892, when the first students took their diplomas, twenty-four men have attained that honour. The examinations to which the students are subjected are maintained at the standard of examinations for degrees and qualifications in Britain. The Chinese, as any one who has had to do with young Chinamen either at home or abroad knows, are excellent students, earnest, hard-working, easily taught and intelligent to a degree. The list of teachers shows that the various subjects are taught by men not only well qualified, but many of them experts in their subjects. Of the original teachers in the College in 1887, when the College was first founded, one is rejoiced to see that the Honourable Dr. Ho Kai, C.M.G., Dr. Gregory P. Jordan, and Dr. J. C. Thomson, still give their valuable services to, and preserve their interest in, the College. Dr. Thomson has, by his tact and organising ability, done more than any other member of the staff to maintain and forward the interests of the College. The medical men resident in Hong Kong, past and present, ably assisted by local scientific men and medical officers of the Army and Navy on the Chinese Station, have, for many years, without pay or reward, given their time, experience, and in many cases their money, to further the interests of the institution. The work these medical men are engaged in is imperial in the widest and best sense of the term; they are presenting modern medicine, and particularly British medicine, at the gates of China, and offering the best they have to give to the people of China. It is easy to wax eloquent over such a theme, but even the most facile pen or fluent speaker cannot do justice to the possibilities of the work the staff of this College are engaged in. Could, however, the possibilities be brought home to the people of the Empire the students of the College would be as many thousands as now they are tens. Much good work has been and is being done, but the lack of encouragement from those in power, or possessed of means, leaves the College de-

pendent upon the self-sacrificing efforts of a few busy doctors, who have to give the few hours they can snatch from their daily toil in a tropical climate to instruct the students without pay, reward, or recognition. Could the meaning and importance of this College be brought home to British folk we would have in Hong Kong a teaching University of the first rank; and instead of turning to Japan, where German is the scientific language of the class-room, the Chinese would turn to an institution where the foreign language they are best acquainted with—namely, English, is the medium of instruction. The prestige accruing to Britain and British medicine, were this fulfilled, must surely be apparent to all, however narrow their imperialism; and it only wants one Governor of the Colony of Hong Kong to take the matter in hand and appeal to the patriotism of the nation to develop a scheme of superlative importance to the welfare of China and to the pre-eminence of Britain in the China Seas.

Abstracts.

MOSQUITOES AND YELLOW FEVER (Moutiques et Fièvre jaune). By Dr. Chantemesse and Dr. Borel. 1 Vol. in 16. Price 1s. 6d. Baillière et Fils, Paris.

The subject is introduced by the following quotation from Article 182 of Chapter V. of the "Sanitary Convention of Paris, 1903," on the subject of yellow fever:—

"The countries specially interested are recommended to modify their sanitary regulations in such a manner as to bring them into relation with the actual data of science on the method of transmission of yellow fever, and especially on the part played by mosquitoes as carriers of the germs of this disease."

The following points have been established:—

(1) That the virus of yellow fever circulates in the blood.

(2) That the mosquito *Stegomyia fasciata*, after being itself infected for at least twelve days, is capable of propagating the disease.

(3) That *Stegomyia fasciata* is the only mosquito capable of playing this part.

The whole world is therefore divisible into two vast regions; in the one *Stegomyia* can live, it is consequently liable to infection by yellow fever; in the other *Stegomyia* cannot exist, and it is therefore not liable to become infected.

The *Stegomyia* mosquito is widely distributed round the earth, but its habitat is strictly defined by the two parallels of 43° of latitude, both north and south; it has never been found outside these limits, and any country situated beyond these parallels ought to be free from yellow fever.

A temperature of about 82° F. is necessary to enable the *Stegomyia* to exist in a normal condition, and more especially to carry on its functions of reproduction, so that even under the most favourable conditions if a few specimens of this insect were brought to France or England by a ship, although

they might live for some days, their reproduction could not take place.

A country liable to infection may become contaminated in one of two ways:—

(1) If a patient in the dangerous stage of yellow fever is admitted thereto, and if *Stegomyia* is found to exist there permanently.

(2) By the importation of *Stegomyia* mosquitoes previously infected, which after contaminating healthy human beings, then find the conditions necessary for their existence, and especially for their multiplication.

An interesting historical and critical study of the several local outbreaks of yellow fever in Europe is now given at some length, and from which the following conclusions are arrived at:—

Yellow fever has almost entirely disappeared from Europe since 1870; the improvements in shipbuilding since this date have rendered difficult the preservation, and especially the multiplication, of mosquitoes on board modern vessels; there is no insurmountable difficulty in eliminating from our ships the chance specimens of *Stegomyia* which might occasionally stray there (especially in the engine-rooms), and in thus suppressing the last chances of propagating yellow fever in our own country.

The prophylaxis of yellow fever may be summed up as follows:—

In countries where *Stegomyia* exists, the patient should be protected from mosquito bites, and the insects should be destroyed wherever possible, as also their breeding grounds.

In other countries, yellow fever may be considered as a non-contagious and non-transmissible disease, calling for no special measures. The bodies of persons dying of yellow fever in the Colonies may therefore be brought home.

J. E. NICHOLSON.

SOME OF THE REGULATIONS CONCERNING PLAGUE, CHOLERA, AND YELLOW FEVER DRAWN UP DURING THE SECOND INTERNATIONAL SANITARY CONVENTION OF AMERICAN STATES, OCTOBER, 1905.

(i.) IMMEDIATE notification of the disease, stating place, date, number of cases, and, in the case of yellow fever, whether the mosquito *Stegomyia fasciata* is in the locality; and in the case of plague, whether rats or mice are infected.

(ii.) Foreign countries to be notified through their Consuls, and weekly notifications to be issued until the outbreak ends.

(iii.) The exact limits of the area imputed to be infected to be declared.

(iv.) Neither plague, cholera, nor yellow fever can be transmitted by merchandise. It only becomes dangerous in case it is soiled by pestous or choleraic products, or, in the case of yellow fever, when the merchandise may harbour mosquitoes.

(v.) All rags and clothing from districts infected by

cholera or plague suspected of being soiled are to be disinfected or destroyed.

(vi.) Ships infected with plague are to be subjected to the following regulations:—

(1) Medical visit (inspection).

(2) The sick are to be immediately disembarked and isolated.

(3) Other persons should also be disembarked, if possible, and subjected to an observation which should not exceed five days, dating from the day of arrival.

(4) Soiled linen, personal effects in use, the belongings of crew and passengers which, in the opinion of sanitary authorities, are considered as infected, should be disinfected.

(5) The parts of the ship which have been inhabited by those stricken with plague and such others as, in the opinion of the sanitary authorities, are considered as infected, should be disinfected.

(6) The destruction of rats on shipboard should be effected before or after the discharge of cargo as rapidly as possible, and in all cases with a maximum delay of forty-eight hours, care being taken to avoid damage of merchandise, the vessel, and its machinery.

For ships in ballast this operation should be performed immediately before taking on cargo.

(7) On ships suspected of plague the crew and passengers may be subjected to observation, which should not exceed five days, dating from the arrival of the ship. During the same time the disembarkment of the crew may be forbidden except for reasons of duty.

The destruction of rats on shipboard is recommended. This destruction is to be effected before or after the discharge of cargo as quickly as possible, and in all cases with a maximum delay of forty-eight hours, taking care to avoid damage to merchandise, ships, and their machinery.

(vii.) If an area should no longer be considered as infected, official proof must be furnished:—

First: That there has been neither a death nor a new case of plague or cholera for five days after isolation, death, or cure of the last plague or cholera case. In the case of yellow fever the period shall be eighteen days, but each Government may reserve the right to extend this period.

Second: That all the measures of disinfection have been applied; in the case of plague that the precautions against rats have been observed, and in the case of yellow fever that the measures against mosquitoes have been executed.

Notes and News.

NURSING IN INDIA.

The hospitals administered under the Dufferin Fund and the Victoria Memorial Scholarship Fund have increased their surgical and nursing staffs since 1898 by no fewer than ten lady doctors, seven assistant surgeons, and 337 hospital assistants and women. The number of women trained at the hospitals amounts to 447. The Victoria Fund, founded by Lady Curzon in 1901, has trained 160 native midwives, of whom many are doing excellent work.

THE PHILIPPINE "JOURNAL OF SCIENCE."

The Government of the Philippines are publishing a "Journal of Science," commencing January 1st, 1906. The Journal is replacing the Bulletins of the Bureau of Government Laboratories, and will include the reports of the work done in all departments of the Bureau. The editor is Paul C. Freer, M.D., Ph.D., the director of the Bureau of Science, with R. P. Strong, M.D., and H. D. McCaskey, B.S., as co-editors. The subscription price is five dollars, U.S. currency, and the Journal can be obtained from the Director of Printing, Manila, Philippine Islands, to whom remittances are to be sent.

THERAPEUTICS.

Chase, Walter B., finds codein, in $\frac{1}{4}$ gr. to $\frac{1}{2}$ gr. or more given hypodermically, is more satisfactory than morphia after abdominal section.

For the relief of intestinal paresis, salicylate of physostigmina in $\frac{1}{100}$ gr. to $\frac{1}{50}$ gr. dose is recommended by the same authority.

PUNJAB VETERINARY COLLEGE.

When the Ajmere Veterinary School was closed a short time ago, the students and staff were transferred to the Punjab Veterinary College, and about twenty students joined. In view of the great demand which exists for the services of veterinary assistants trained at the Lahore College, which far exceeds the supply, it was decided to increase the number of students considerably and to improve the standard of education. The extra staff from Ajmere made this practicable and the Local Government has provided the extra accommodation necessary, and a new laboratory and classroom have been built in connection with the segregation ward sanctioned by Sir Charles Rivaz, while a spacious lecture-room and offices for a hospital have also been erected.—*Pioneer Mail*, January 26th, 1906.

POISON IN JUAR FODDER.

SIR,—In the *Pioneer* of the 13th instant you mention the poisonous effect of juari stalks as a curious thing, but at least in the Northern Punjab and Bar tract this fact is known even to every zemindar child. This phenomenon is limited to drouthy seasons in Barani tracts only, and to such fields of well-irrigated areas also which have not been watered from wells. The poison may be prussic acid, but the zemindars think that a kind of very fatal and poisonous worm generates in the stalk, and any animal (cow, bull, buffalo) which eats the stalk certainly dies within an hour or two, but goats do not suffer a bit. To remove the poison, zemindars, after cutting such stalks, sprinkle water over them and then bury them for some hours under blankets. Even a little quantity of rain removes the poison from the standing stalks.—*W. Pioneer Mail*, January 19th, 1906.

THE Medical College of Calcutta has received £6,000 out of the lac of rupees presented to the Prince of Wales by the Maharaja of Darbhanga for distribution amongst Indian charities.

A CHAIR OF COLONIAL MEDICINE IN PARIS.

M. Emile Flourens, the ex-Minister and present Deputy for the Department of La Seine, advocates the endowment of a Chair of Tropical Medicine in Paris on the lines of those existing in the Schools of Liverpool and London, and furthermore, that only those medical gentlemen who have obtained the diploma in tropical medicine should be allowed to practise in the Colonies; this much is due to the troops, for whom little has been done; to the officials, for whom still less has been done; and to the natives, who, as a rule, have received nothing in return for their loss of independence.—*L'Europe Coloniale et Diplomatique*, January 24th, 1906.

ANKYLOSTOMIASIS PROPHYLAXIS.

In Belgium, by the establishment of dispensaries for the miners afflicted with ankylostomiasis, and the payment of 1 franc 50 cents. continued daily until the cure was complete, the disease has been stamped out in five of the largest mines.

DESERT CAMPS: A PROPOSED METHOD OF TREATMENT.

Felkin, R. W., holds (*Treatment*, January, 1906) that camp-life in the real desert at a distance from towns gives a genuine mental and bodily rest unobtainable elsewhere. The expenses should not be much more than in a large hotel in a city.

On the evening of December 15 last the first official banquet of the "International Medical Association for the Suppression of War" was held in Paris at the Hôtel Continental.

There were about fifty members present, all of them belonging to the medical profession. The chair was taken by Dr. J. A. Rivi re (of Paris), the founder and President of the Association.

The after-dinner speeches were all against war, and great stress was laid on the preponderating part which the medical profession throughout the world, by reason of its influence on Society, is called upon to fill in this work of realising universal peace.

The following gentlemen spoke: Professors Langlois and Richet, Doctors J. A. Rivi re, Mar chal, Grellety, Suarez de Mendoza, Mazery, Cogrel, and B rillon.

Although this Association is only a year old, it already numbers 600 members, all of them medical men, and includes more than 200 professors of all nationalities.

A NEW GERMAN SLEEPING SICKNESS COMMISSION.

The *Medical Weekly* of Berlin announces that Professor Robert Koch has been commissioned by the Imperial Government to proceed to East Africa in order to resume his investigation into the causes of the sleeping sickness. Professor Koch proposes to sail at the beginning of April, and it is understood that he will make Entebbe, in British Uganda, the headquarters for his first series of expeditions. It is anticipated the expedition will last about eighteen months, and £6,000 has been allotted for the expenses of the first year.

As our readers are aware, Professor Koch has already passed some time in East Africa in the study of this and kindred diseases, but in view of the successful work of the English commissions engaged in the investigation of sleeping sickness, there is little beyond matters of detail left for Professor Koch's investigation from the etiological standpoint. On this account the Germans would perhaps have been wiser to have sent some of their admirable economic entomologists to study the question of checking the multiplication of the flies concerned in the transmission of the disease, as this department of the army of science is one in which England is, unfortunately, very short handed; and this most practical question appears at present to be almost untouched.

THE more than usually mild winter in Britain contrasts peculiarly with the weather experience in Algiers, where deep snow has fallen, breaking down telegraph lines, blocking the railways and causing great damage to property.

The establishment of a medical school for Burmese is contemplated in Rangoon.

Drugs.

TRYPSIN IN CARCINOMA.

TRYPSIN is being given by many practitioners in Britain at the present moment in cases of carcinoma. Perhaps the best method of exhibition is hypodermically, as all possibility of total destruction of the ferment in the stomach is avoided.

Messrs. Allen and Hanbury, 7, Vere Street, London, W., supply Liquor Trypsin Co. for internal use; Injectio Trypsin Co. for hypodermic use, and Pigment Trypsin Co. for local use.

MALARIAL FEVER AND DRUGS.

WE publish a portion of a letter from Mr. J. H. Niemann, Daly River, Northern Australia, which appeared in the *Chemist and Druggist* of February 3rd, 1906: "Is anything known or published regarding the manner in which malarial fevers modify the normal effects of drugs and of other germ diseases? . . . I have ascertained from painful experience that belladonna cannot be safely given to any person whose system is impregnated with malaria, except in infinitesimal doses; that the effects of many other drugs are diminished or increased; and have strong reasons for asserting that the benign malaria of North Australia greatly modifies all other germ diseases, if it does not entirely prevent them. The first point, regarding the effect of drugs, is of great importance to the prescriber; the second, regarding the prevention of other diseases, is important to everyone, especially as tuberculosis is included in the list of 'other diseases.'"

We must confess we are unable to make any definite answer to Mr. Niemann on this subject. The suggestion is a novel one, but it is possible, now that the attention of our readers has been directed to the action

of drugs in persons suffering from malarial infection, that some information may be forthcoming from medical men engaged in practice in the tropics.

Books and Papers Received.

PROSTATISM WITHOUT ENLARGEMENT OF THE PROSTATE. By C. H. Chetwood.

Chetwood attributes the signs and symptoms of so-called prostatic irritation when the prostate is not enlarged to contracture of the neck of the bladder, in other words, a fibrous stenosis of the vesical orifice. He does not recommend cutting the stricture, but galvano-prostatotomy through a perineal opening by means of an instrument he has devised. His pamphlet is a reprint from the *Annals of Surgery*, April, 1905.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"American Medicine," January 6, 1906.

MALARIA INFECTION IN KURDESTAN.

Underwood, H. L., considers that in Kurdistan malaria is not only carried by mosquitoes, but also by bed bugs, lice and fleas.

Several species of mosquito, including some Anopheletes, however, occur in Central Asia, and from the point of view of comparative helminthology, any such means of transport of malaria as that suggested is in the last degree improbable.

"Le Nevis Scientifique," November, 1905.

CHOLERA PROPHYLAXIS.

Chantemesse, A., and Borel, F. contend that no person suffering from cholera should be allowed to enter an uninfected country. He should be quarantined, the clothes disinfected, food and drink carefully examined, protection against fly contamination, especially where latrines are defective, and every precaution taken to prevent gastric and intestinal upset.

Such recommendations are, however, of a most reactionary type, and if adopted, would carry us back to the bad old days of quarantine. Modern sanitary practice has shown that, under proper precautions, there is no danger whatever in landing cholera patients, and the adoption of these modern measures have rendered the importation of cholera practically impossible in every country where they have been employed. Quarantine has been abolished by all the more civilized nations because it had proved itself impractical and inefficient.

"American Medicine," January 13, 1906.

AMERICAN HOOKWORM.

Stiles, C. W., and Goldberger, J., find that the eggs of *Necator americanus* may hatch the rhabditiform embryo in less than twenty-four hours. When the young intestinal stage of the worm is placed on the skin of the back of dogs and rabbits the worm penetrates the skin, and reaches the small intestine in from eight to twelve days.

"Journal of Cutaneous Diseases," January, 1906.

TROPICAL ULCERATION OF NOSE, PHARYNX, AND LARYNX.

Fordyce, J. A., describes a case of ulceration of the upper air passages, which began with an offensive muco-purulent discharge from the nose. The nose enlarged and ulcerated, the septum necrosed, the uvula disappeared, and the soft palate presented a worm-eaten appearance; the tongue became atrophied at the base, and the pharynx and larynx showed ulcerations and old cicatrices.

A condition similar and probably identical with the case described was met with by Dr. W. F. Arnold at Guam in 1902. Dr. Arnold found 5 per cent of the population of Guam suffering from this ailment. The disease is neither tubercular nor syphilitic. Breda has described analogous ulcerations amongst Italians returned from Brazil, and named by him *Frambæsia Brasiliana*, or Boubas.

The above is of interest in connection with the paper on "Rhino-pharyngitis Mutilans," by Surgeon J. E. Leys, M.D., U.S. Navy, published in another column, as it seems probable that both papers refer to the same condition.

"Boston Med. and Surg. Journal," January 11, 1906.

MALARIA IN THE PHILIPPINES.

Chamberlain, W. P., from the study of 120 cases of malaria in Camp Gregg, Philippines, concludes that (1) large numbers of anopheles increase the malarial index; (2) Quartan infections were infrequent; (3) Estivo-autumnal infections were remittent 35 per cent., quotidian intermittent 25 per cent., tertian intermittent 30 per cent.; (4) no distinctive parasites were recognised in the estivo-autumnal infections.

"Nature," January 4, 1906, p. 235.

INSECTS AS CARRIERS OF DISEASE.

Shipley, A. E., F.R.S., publishes an address to the British Association at Pretoria under the above title. From the nature of the occasion it can hardly be expected to contain any information that has not appeared in these columns, but it forms, nevertheless, a most convenient and up-to-date *résumé* of our knowledge on the subject, which may be consulted with advantage by any one requiring a handy reference paper on this question.

"Indian Med. Gazette," January, 1906, p. 7.

THREE DAYS' FEVER OF CHITRAL.

McCarrison, Captain R., I.M.S. The author describes his paper as a contribution to the unclassified fevers of India. As may be gathered from the title the attacks are short, but they are also sharp, the principal subjective symptoms being bone-aches and frontal headache.

Though hitherto returned as such, the disease is not malarial, as the blood contains no parasites, either protozoal or bacterial. It can hardly be influenza, as, though seasonal, it is confined to the hotter times of the year, coinciding with the mulberry harvest. It is not contagious, though houses and places become infective, so that the disease can only be acquired by visiting them. Those who have suffered are immune to subsequent attacks. Quinine is useless, either remedially or as a prophylactic, and treatment resolves itself into measures to diminish the patient's discomfort, such as sponging and douching.

Many years ago the writer met with exactly similar cases in Natal, and indeed suffered in his own person. At that time the cases were locally known to the profession as "dengue," and were, he believes, usually returned as such.

The uniformly rapid and complete recovery, however, made any such a diagnosis quite untenable, so that personally he returned them as "febricula," for want of any better term.

He feels, however, little doubt as to the identity of the clinical pictures, and it is to be noted that Captain McCarrison, while rejecting the diagnosis, remarks on its similarity to dengue.

We should like to hear from our readers in Natal and Zululand whether such cases are still met with there, and would in such case draw their attention to the circumstance that Captain McCarrison evidently suspects sandflies of being the transmitting agents of the disease, and so suggests the prophylactic use of mosquito nets.

"Revista de Med. y Ciruj.," Vol. ix., No. 22, 1905.

ANAKHRE OR GOUNDOU.

Ayala, A., Havana, reports a case of goundou occurring in Caracas, Venezuela, in a white man, aged 39. The growth on either side of the nose was symmetrical. The man was otherwise quite healthy.

"Reforma Medica," August 12, 1905.

SUBFEBRILE TEMPERATURE OF ANKYLOSTOMIASIS.

Gabbi, W., states that slight elevations of temperature are present in ankylostomiasis. This state, which he terms "subfebrile," is present in severe cases only. The elevation in temperature is irregular, there is either an evening rise, an intermittent, or an irregular subcontinuous type. Cadiri finds albumose present in the blood of persons with ankylostomiasis, and believes that it is the presence of albumose in the blood which determines the rise in temperature.

"Quarterly Journal Microscopical Science," November, 1905.

OBSERVATIONS ON HÆMATOZOA IN CEYLON.

Castellani, Aldo, and Willey, A., state they discovered in human blood fine "vermicules" of crescentic form, rather longer than the diameter of a red corpuscle, characterised by the absence of pigment and presence of vacuoles. The specimens were taken from a case of "fever," which showed no malarial parasites and a negative Widal reaction, and are not at all unlike certain known trypanosomes in certain stages of development. Similar bodies were found in the finger blood of fever patients, and the authors do not appear to consider them as freed and altered "crescents," or as necessarily connected with malarial parasites at all. Similar bodies were found in a babbling thrush and in the Indian crow.

"C. R. Soc. Biologie," T. lix., pp. 240-245.

SERUM DIAGNOSIS OF MEDITERRANEAN FEVER, &c.

Nicolle, C. employs for serum diagnosis cultures of the *B. melitensis*, three to six days old, on ordinary gelose, emulsified without preliminary grating in physiological water or bouillon. The suspected serum is added to this in the proportion of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{10}$, $\frac{1}{20}$, $\frac{1}{50}$, and $\frac{1}{100}$, in small test tubes, and the examination is made after sixteen to twenty hours. When distinct agglutination, to the naked eye and under the microscope, is obtained in $\frac{1}{10}$ dilutions, he considers that the diagnosis of Malta fever may be taken as proved.

In the second paper he records the results of the application of Wright's serum reaction to the cases of thirty-five patients affected with various other infections, and shows that serum drawn from them had little or no agglutinating action on the *B. melitensis*.

In collaboration with M. Hyat, in the same publication, he gives results showing the value of the procedure in actual practice.

In five cases, which were ultimately proved not to be instances of Malta fever, the action was negative, while in thirteen others, which presented throughout the clinical picture of Malta fever, it was positive.

The leucocyte formula of Malta fever is an intense mononucleocytosis amounting to 80 per cent. of mononuclear cells.

"C. R. Soc. Biologie," T. xix., pp. 302-304.

DIAGNOSTIC VALUE OF POLYNUCLEAR HYPERLEUCOCYTOSIS OF BLOOD IN TROPICAL ABSCESS OF LIVER.

Khouri, J., out of ten cases examined, found the number of leucocytes was normal in one, subnormal in four, while three showed moderate, and three pronounced leucocytosis. From this it is evident that the symptom or its absence is of little or no diagnostic value.

"Amer. Naturalist," xxxix., pp. 601-724.

THE INTERRELATIONSHIPS OF THE SPOROZOA.

Crawley, H., regards the relationships between the sub-classes *Telosporidia* and *neosporidia* as vague, so that the class, taken as a whole, may not even belong to a single phylum. Amongst the *Telosporidia* he regards the gregarines as the most primitive form, and, amongst the latter, the polycystids. M. F. Mesnil, the well-known protozoologist, commenting on this paper in the current *Bulletin de l'Institut Pasteur*, notes that Crawley ignores the now well-recognised intestinal monocytsids, and states his opinion that it is amongst these that the ancestral form should be sought. Both, however, are agreed in considering the Shigogregarines as derived from the Engregarines. He looks upon the Coccidia and the Hemocytosoa as closely allied, and so approves of Doflein combining them under the title of Coccidiomorpha.

"C. R. Soc. Biologie," lix., p. 306.

ABSORPTION OF TUBERCLE BACILLI BY FRESHLY SHAVEN SKIN.

Nouri, Osman (Inst. Bacter., Constantinople), shaved the inguinal region of guinea-pigs, and then rubbed them with absorbent cotton, fouled with tuberculous sputum, with the result that the corresponding lymphatic glands became swollen in eight to fifteen days, and the animals died in from thirty to fifty days.

This is hardly pleasant reading for those who do not shave themselves, and, in view of the rudeness of of the tonsorial art in Mahomedan and other countries where the victim is scraped with a blunt razor, moistened with water, which the operator not unfrequently supplements, in awkward corners, with saliva, may account for the puzzling location of certain tubercular lesions occasionally met with in such countries, where the portions of the body habitually shaven are much more extensive than is anywhere the case in Europe.

"Centralb. für Bakt. Parasiten. u. Infektionskrank.," xxxix., pp. 610-613.

A NEW, CERTAIN, AND HARMLESS METHOD OF IMMUNISATION AGAINST PLAGUE.

Huetope, F., and Kiruchi, J., by experiments based on those of Bail, show that an "agressive" effective against plague can also easily be obtained. A single injection prolonged the life of animals subsequently inoculated with plague, and a second infection enabled them to resist the action of an infection surely fatal to controls, always provided that the inoculation be not practised too soon after the second, in which case the morbidity of an infection is not diminished but enhanced.

They accordingly claim to be the first to devise a sure and harmless plan of immunisation.

"Ann. Soc. Entom.," Paris, lxxiv., pp. 20-23.

EGG DEPOSITION AND THE LARVAL LIFE OF THE TABANIDÆ.

Leguillon, A. As the Tabanidæ are implicated in the transmission of trypanosomes, the author's observations on *T. quatuornotatus*, Meig., possess a special interest for our readers.

The eggs are laid in bunches in places that may be either dry or moist, for instance, on the leaves of plants, and are at first white, but soon darken. As is already known, some

larvæ may be aquatic and others terrestrial, and that their habits are carnivorous. The eggs of the species under consideration hatched out in fourteen days (in June), and are white and transparent.

They feed on dead prey and on organic detritus, and perhaps even on sluggish living animals.

They can live under varied conditions of moisture, and even in water. Further observations are promised.

Personal Notes.

R.A.M.C.

Embarkations.—For India: Lieut.-Cols. B. J. McCreery and J. M. F. Shine; Majors T. W. Gibbard and H. A. Hinge; Lieuts. J. Campbell, W. H. Hills, J. P. Lynch, W. G. Maydon, and L. V. Thurston. For Mauritius: Lieut.-Col. A. Peterkin; Capt. C. S. Smith; and Lieuts. P. Power and C. S. Wallace. For Malta: Major C. C. Fleming, D.S.O., and Capt. H. S. Anderson. For West Africa: Major G. T. Rawnsley and Capt. J. McD. McCarthy.

Ceylon (November 1, 1905).—Lieut.-Col. R. D. Hodson, Capt. L. M. Purser, and Capt. T. B. Unwin, R.A.M.C., are under orders for England, tour expired, and will probably leave Ceylon on January 3rd, 1906, in His Majesty's transport *Dunera*. Lieut.-Col. G. H. Sylvester, Capt. E. C. Hayes, and Lieut. C. R. Miller, R.A.M.C., are expected by the same boat on November 30th, 1905.

Lieut.-Col. G. H. Sylvester, R.A.M.C., takes over the command of the Royal Army Medical Corps and Senior Medical Officer of the Troops in the Ceylon Command. Capt. E. C. Hayes and Lieut. C. R. Miller, R.A.M.C., will be stationed in Colombo, the former performing the duties of Sanitary Officer in addition to ordinary duty.

Sierra Leone.—Capt. H. W. Grattan, R.A.M.C., writes (November 24th, 1905): Capt. W. H. S. Nickerson, V.C., arrived on November 23rd, for a tour of service.

Simla (India).—Capt. E. Blake Knox, R.A.M.C. Secretary to the Principal Medical Officer, His Majesty's Forces in India, writes (November 23rd, 1905):—

"Appointments.—Lieut.-Col. A. W. P. Inman, M.B., R.A.M.C., to officiate as Principal Medical Officer, 8th (Lucknow) Division, *vice* Col. G. D. N. Leake, R.A.M.C., granted leave out of India. Lieut.-Col. J. R. Dodd, R.A.M.C., to officiate as Principal Medical Officer, Bareilly and Gharwal Brigades, *vice* Col. G. J. Kelly, I.M.S., appointed to officiate as Principal Medical Officer, 7th (Meerut) Division. Col. H. R. Whitehead, R.A.M.C., to officiate as Principal Medical Officer, 2nd (Rawal Pindi) Division, *vice* Col. B. M. Blennerhassett, C.M.G., R.A.M.C., granted six months' sick leave out of India. Lieut.-Col. D. O'Sullivan, R.A.M.C., to officiate as Principal Medical Officer, Abbotabad and Sialkot Brigades, *vice* Col. Whitehead, R.A.M.C., transferred to Rawal Pindi temporarily. Lieut.-Col. D. O'Sullivan has also been confirmed to the Command of the Station Hospital, Rawal Pindi, with effect from November 4th, 1905.

Capt. W. R. P. Goodwin, R.A.M.C., to be Personal Assistant to Principal Medical Officer, Northern Command, *vice* Capt. E. T. F. Birrell, R.A.M.C., vacated. Lieut. S. C. Bowle, R.A.M.C., to be Dental Specialist in Western Command."

Singapore (Straits Settlements).—Lieut.-Col. W. Dick, R.A.M.C., writes (November 2nd, 1905): "The following officers are tour expired. Lieut.-Col. W. Dick, Major J. H. E. Austin, and Capt. G. F. Sheehan. Notification has been received that these officers are to be relieved in December by Lieut.-Col. H. H. Johnson, C.B., Major C. B. Martin, and Lieut. G. A. D. Harvey. Major J. Ritchie, who was also tour expired, has been permitted to extend his service in Singapore for another year."

The services of Capt. J. Tobin, R.A.M.C., on the Aden Boundary Commission, have been brought to the special notice of the Commander-in-Chief.

INDIAN MEDICAL SERVICE.

Major Molesworth, I.M.S., Captain Vane and Captain Popham, now on Lord Amthill's Staff, have been appointed to serve on the Staff of Sir Arthur Lawley, the Governor-designate of Madras.

Major E. R. Parry, M.B., I.M.S., is appointed temporarily to be Superintendent of the Dacca Central Gaol, *vice* Mr. W. A. C. Beadon, retired, with effect from the date of receiving charge of the office.

The services of Captain A. C. MacGilchrist, M.B., I.M.S., are placed at the disposal of the Government of India in the Home Department.

Captain W. D. Ritchie, M.B., I.M.S., Civil Surgeon, is posted to Jalpaiguri.

Major J. S. S. Lumsden, I.M.S. Civil Surgeon, Bahraich, furlough on medical certificate for one year, from December 23rd.

Consequent on the death of Honorary Captain G. McCall, I.S.M.D., Civil Surgeon, Babu Kedar Nath Bose, Officiating Civil Surgeon, Jaunpur, to be confirmed as a Civil Surgeon.

To be Major: Captain Hugh Bennett, M.B., F.R.C.S.E.

SANITARY—PLAGUE.

Lieutenant-Colonel W. B. Bannerman, M.D., I.M.S. (Madras), Director, Plague Research Laboratory, Parel, is granted privilege leave for three months, with effect from November 18th.

Captain G. Lamb, M.D., I.M.S. (Bengal), is appointed to officiate as Director of the Plague Research Laboratory, Bombay, during the absence on leave of Lieutenant-Colonel W. B. Bannerman, M.D., I.M.S., in addition to his special duty under the orders of the Sanitary Commissioner with the Government of India.

DEPARTMENT OF REVENUE AND AGRICULTURE.

Mr. R. E. Montgomery, M.R.C.V.S., Civil Veterinary Department, is appointed with effect from December 8th, 1905, to make, under the orders of the Inspector-General, Civil Veterinary Department, a special investigation into the diseases of camels.

COLONIAL MEDICAL SERVICE.

Dr. W. T. Kergin, of Port Simpson, British Columbia, has taken over the duties of a Medical Health Officer in that Province of the Dominion.

Fry.—The selection of Dr. W. H. Fry, Colonial Surgeon of Province Wellesley, North, Straits Settlements, for the office of State Surgeon of Pahang, Federated Malay States, has been approved by the Secretary of State.

PURCHAS.—Dr. F. A. G. Purchas, District Medical Officer for Newport, Manchester, Jamaica, has been transferred to Swanswich Trelawny, in place of Dr. C. T. Dewar, who has retired from the service.

The offices of Dr. E. H. Bannister and Dr. J. W. Hawkins as Health Officers for the Port of Bridgetown, Barbados, have been abolished on the coming into operation of the new Quarantine Ordinance. Both officers receive gratuities.

Dr. J. White Hopkins, Assistant Medical Officer, Sarawak, acts as Principal Medical Officer and Superintendent of Indian Immigrants during the absence on leave of Dr. A. J. G. Barker.

Dr. F. O. Stedman has been made a Member of the Medical Board of Hong Kong, and will serve as Secretary of the Board in place of Dr. Alexander Rennie, who has resigned.

Dr. Alexander Rennie has permanently retired from practice in Hong Kong.

Dr. Smartt has arrived in England from British Guiana.

Dr. Ireland has arrived in England from Trinidad.

COMMERCIAL CORPORATIONS.

BAGGS.—Dr. J. G. Baggs has been appointed Medical Officer to the Para Electric Railway and Lighting Co., of Brazil, and leaves England about February 1st.

DOMESTIC.

MACNICOL.—At the Medical Mission House, Kalna, Bengal, on January 20th, 1906, the wife of the Rev. Malcolm Macnicol, M.B., C.M., of a son.

ILLIUS—FORD.—At St. John's Church, Calcutta, on December 30th, 1905, by the Rev. C. R. T. Winckley, Henry Warwick Illius, Capt. I.M.S., to Frances Elsie, younger daughter of the late Matthew and Mrs. Ford.

PLAGUE.

PREVALENCE OF THE DISEASE.

	Cases.	Deaths.
India.—Week ended Dec. 9th...	—	3,075
" " 16th...	—	3,247
" " 23rd...	4,182	3,170
" " 30th...	5,184	4,278

South Africa.—No plague up to January 20th, 1906, in any part of South Africa since November 18th, 1905, when one case was reported in Port Elizabeth.

Rats and mice were still found plague-infected in Port Elizabeth on January 20th.

	Cases.	Deaths.
Mauritius.—Week ended Jan. 5th...	4	4
" " 12th...	4	3
" " 19th...	1	1
" " 26th...	1	1
" Feb. 2nd...	2	1
" " 9th...	1	0

	Cases.	Deaths.
Hong Kong.—Week ended Jan. 3rd...	2	2
" " 6th...	2	2
" " 10th...	6	6
" " 27th...	1	1

Persia.—Plague prevailed in the Maisar district of Seisan on January 22nd.

	Cases.	Deaths.
Zanzibar.—Week ended Oct. 14th...	15	8
" Nov. 4th...	12	—

Egypt.—Case of plague reported in Alexandria on November 7th.

Australia.—No fresh cases of plague in Queensland since September 14th. As late as December 20th, 1905, plague-infected rats were found in the neighbourhood of Darling harbour.

Sydney.—Nine cases of plague occurred on a French mail steamer which called at Sydney, and infected rats were found on board the vessel.

Brazil.—From January 1st to October 22nd, 1905, there were 91 deaths from plague in Rio de Janeiro.

Madeira. — The report that plague existed at Madeira is contradicted.

THE CAMPAIGN AGAINST THE RATS IN RANGOON.

THE total number of plague cases for December was 98, with 91 deaths, against 113 cases and 110 deaths during November. The incidence of the disease was heaviest among the low-class Hindu population. One hundred and thirty-two rats were examined, of which 27 were found infected with plague. Fourteen thousand six hundred and sixty-six rats were destroyed during December. Although the total number of cases was less in December than in any previous month since the outbreak of the epidemic in February last, yet no quarter of the Municipality was free from the disease during the whole month. No case is reported from Cantonments. The centres of the infection appear to be widely scattered throughout the municipal area, and there is no indication that the disease has been stamped out in any locality.—*Pioneer Mail*, January 12th, 1906.

PLAGUE RESEARCHES.

(1) M. Herzog, from experience of plague gained in the Philippines, finds a hyaline fibrin thrombosis in the glomeruli of the kidney; in *post-mortem* examination of seven out of twenty cases of plague, Dr. Herzog believes that plague is not a true septicæmia, but a local lymphatic infection, and that the universal dissemination of the infecting bacilli through the blood current generally only occurs during the agonal stage.

(2) R. P. Strong has succeeded in preparing a vaccine against plague. He uses the living plague organisms in his protective inoculations. So far, the experiment has proved successful in rats.—*Manila Medical Society*, November 22nd, 1905.

Reviews.

PATENT FOODS AND PATENT MEDICINES. Two lectures.

By Robert Hutchison, M.D., F.R.C.P. Second edition. John Bale, Sons and Danielsson, Ltd., Oxford House, 83-91, Great Titchfield Street, Oxford Street, London, W., 1906. Price 1s. net.

It is time some one spoke out freely about patent foods and patent medicines, and Dr. Robert Hutchison has done so in fearless terms. Some of his remarks are most telling and express what every medical man, who thinks at all, must have frequently wished to express. He says, "most patent foods exist because certain persons have found that it pays to produce them"; and, we might add, the benefits they bestow upon the public are confined to those few who profit by the production of the articles. The further statement that of the patent foods "not one of them is worth the money asked for it," is an expression of opinion with which every medical man will coincide; and that it is merely the fact that patients will more readily listen to their doctor when he advises patent foods, in place of simple foods prepared at home, that any medical man would ever think of recommending them. The honesty of the doctor is thereby strained, but as he has to live he, calling it tact, agrees with the patient's desires. In regard to patent medicines, Dr. Hutchison shows that they are compounded for the most part of the usual pharmacopœial drugs in ordinary use, and attributes their reputation to "persistent and audacious advertisement." Belief in quackery and patent medicines is "as rife, nay, I venture to say is more rife, in Belgravia than in Bethnal Green," so that so-called education has nothing to do with their belief in the efficacy. These lectures should be read by every practitioner at home and abroad, as he will be thereby better able to guard his patients against the patent food vendor, who is destroying the health and emptying the pockets of a credulous public, and to stem the influence of quackery, which tends to react deleteriously upon the character of the people of any nation. One means of obtaining "certificates of cure" Dr. Hutchison has not told us, it is this: An agent for a patent medicine finds out from a tradesman those of his customers who owe him money. He buys the bad debts for a small sum, proceeds to the houses of these customers and informs them that if they will take his medicine for a week, and at the end of the week state that the medicine has done them good or cured them, he will pay the bill they owe to the tradesmen. This method of obtaining evidence of cure needs no comment, but it is one which was told in the public press lately.

EXAMEN DE 43 CAS DE PALUDISME PROVENANT DE RÉGIONS TROPICALES (An Examination of 43 Cases of Malaria from Tropical Regions). By Surgeon-Major A. Billet, Chief of the Bacteriological Laboratory at the Military Hospital at Marseilles. Extract from the Minutes of the Société de Biologie. (Meeting held on November 25th, 1905.)

During the year 1904-1905, Dr. Billet was able to make notes on 43 cases of malaria which came from the Tropics, viz., Madagascar, Tonkin, Senegal, Ivory Coast, and the Soudan. They were divided as follows:—

(1) *Primary tertian* ague, simple or double, characterised in all cases by small schizonts, annular, slightly or not at all pigmented, with crescents. Endogenous forms of multiplications rare or even absent in the circulation. Schüffner's dots scanty. (20 cases.)

(2) *Secondary tertian* ague (chronic), simple or double, characterised by large schizonts, amœboid, black pigment abundant, rounded gametes. Endogenous forms of multiplication, with from 16 to 20 merozoites. Schüffner's dots plentiful. (18 cases.)

(3) *Quartan* ague, characterised by pigmented schizonts, smaller than those of secondary tertian type, and by gametes, also rounded, but smaller. Segmentation forms show eight merozoites at most. No Schüffner's dots in the infected blood cells (5 cases).

According to Laveran both the small and the large forms belong to the same pathogenic agent. Dr. Billet verifies this assertion, inasmuch as it applies to the tertian type of ague, which is more commonly found in the French colonies generally; in fact, he quotes four cases where he was able to study the transformation of the small tertian parasitic rings into large pigmented parasites of the same type of malaria, which he designates as secondary ague.

He considers the parasite of quartan ague as belonging to a distinct species from that of tertian ague. He was only able to observe crescents in two authentic cases of quartan ague.

WITH THE ABYSSINIANS IN SOMALILAND. By Major J. Willes Jennings, R.A.M.C. (Hodder and Stoughton.)

Although in no sense a medical work, but a well-written and breezy book of travel, this book will be interesting to all our readers as a lively illustration of the evidences of the field of adventure and interest open to those who follow up the profession of medicine in tropical lands. Major Jennings was in medical charge of the little knot of British officers who were attached to the Abyssinian Army which co-operated with us against the much misnamed "Mad Mullah"; and his adventures make pleasant reading, and convey to the reader in excellent colloquial English a vivid idea of the country and its primitive inhabitants.

Those who have shared in similar expeditions will not be surprised to find Major Jennings devoting more of his time to veterinary surgery than to human

medicine, for the Abyssinian soldiers proved so healthy as to seldom require any other treatment than an occasional dose of male-fern, while the efficiency of the transport animals depended greatly on his scientific and devoted attention.

As might be expected, however, the book is by no means devoid of interesting medical observation. He notes, for example, how ill the fish-eating theory of the causation of leprosy fits in with the facts of the case in Abyssinia, where there are some 8,000 lepers who can rarely, if ever, have eaten fish, owing to the scarcity of the article in a country where "during the greater part of the year many of the wells do not contain water, much less fish." His remarks on the enormous practical sanitary value of tropical sunlight are also interesting, as he doubts if the inhabitants of the terribly insanitary Abyssinian towns could survive at all but for the "merciful dealings of a tropical sun, which can well-nigh convert the smell of a pole-cat into the aroma of a nosegay." His instance of the disappearance of cholera effected by removing troops from a warm, damp, shady site, to a bare, breezy, tropical plain, is most instructive. He notes, too, that the greater part of Abyssinia is practically free from malaria.

It is mainly, however, as a book of travel and adventure that the book is to be commended, and from this point of view it is one of the best that has appeared for some time.

Literary References.

Beri-beri.

- Angier.** Le béri-béri; notes recueillies à l'hôpital de Choquan. *Ann. d'hyg. et de méd. colon.*, Paris, 1905, viii.
- Bell, W. D.** Beri-beri in the Philippine Islands. *Am. Therapist*, New York, 1904-5, xiii.
- Borel, F.** Le béri-béri nautique d'après les travaux les plus récents. *Normandie méd.*, Rouen, 1905, xx.
- Crosier, G. C.** An outbreak of true beri-beri among the students at Tura, Garo Hills, Assam. *Indian M. Gaz.*, Calcutta, 1905, xl.
- Contribución al estudio del beri-beri; historia definiciones, etiología.** (From *Bol. méd. d. Canca.*) *Rev. méd. de Bogota*, 1903-4.
- Dürk, H.** Ueber Beri-beri und intestinale Intoxikationskrankheiten im malaischen Archipel. *München. med. Wchnschr.*, 1905, lii.
- Fujikawa, Y.** Beitrag zur Geschichte des Kakke (beri-beri). Japanese text, Ausz., Hft. 7, *Shinkeigaku Zasshi*, Tokyo, 1904-5, iii.
- Gerrard, P. N.** Seven cases of beri-beri. *Lancet*, London, 1905, i.
On the effect of pilocarpine in beri-beri (wet type). *J. Trop. M.*, London, 1905, viii.
- Heanley, C. M.** Some analogies which favour protozoal hypothesis of beri-beri. *Indian M. Gaz.*, Calcutta, 1905, xl.
- Henggeler, O.** Ueber Beri-beri und indische Spruw. *Cor.-Bl. f. schweiz. Aerzte*, Basel, 1905, xxxv.
- Hulshoff Pol, D. J.** Beri-beri. Voorkoming en genezing door toediening van Katjang-idjo (*Phaseolus radiatus*, L.). Amsterdam, 1904, J. H. de Bussy. 8vo.
- Jeannelme, E.** Le béri-béri et le prisons. *Arch. de parasitol.*, Paris, 1905, ix.
- Kunert.** Ueber Beri-beri. *Allg. med. Centr.-Ztg.*, Berlin, 1905, lxxiv.
Ueber Beri-beri. *Berl. klin. Wchnschr.*, 1905, xlii.
- Lop, P. A.** Une épidémie de beri-beri à Marseille. *Presse méd.*, Paris, 1904, ii., annexes.
- McCool, J. L.** Beri-beri. *Am. Med.*, Philadelphia, 1905, x.
- Miura, K.** Notizen zur Symptomatologie von Beri-beri. (German abstr., suppl., 13-17). *Shinkeigaku Zasshi*, Tokyo, 1905-6, iv. *Ingaku Chuwo Zasshi*, Tokyo, 1905-6. Also, *Iji Shinbun*, Tokyo, 1905.
- Miura, M.** (The pathology of beri-beri.) *Sei-i-Kwai M. J.*, Tokyo, 1904, xxiii., No. 273.
- Miura.** (Appendix to regulations for beri-beri.) *Tokyo Iji Shinshi*, 1905.
- Ogata, T., and Kono.** (The treatment of nurslings when the mother is diseased with beri-beri.) *Chingai Iji Shinpo*, Tokio, 1905, xxvi.
- Proposito, A.** Do beri-beri na nossa marinah militar. *Rev. da Soc. de med. e cirurg.*, Rio de Janeiro, 1905, ix.
- Ramus, C., and Stimpson, W. G.** Beri-beri (fatal case with necropsy). *Rep. Surg.-Gen. Pub. Health and Mar. Hosp. Serv. U.S.*, Washington, 465-467.
- Simonin, J.** L'alimentation du soldat japonais et le beri-beri. *Arch. de méd. et pharm. mil.*, Paris, 1904, xlii. Also, *Lancet*, London, 1902, ii., 1512.
- Soledade, J.** Hematologia do beri-beri. *Gaz. med. da Bahia*, 1904-5, xxxvi.
- Takasu, K.** Ueber das Blut der an Kakke leidenden Säulinge und Erwachsenen. *Arch. f. Kinderh.*, Stuttgart, 1904-5, xl.
- Teranai, Y., and Sayegi, M.** (Chemical researches on beri-beri.) *Saikingaku Zasshi*, Tokyo, 1904.
- Teruuchi and Saigi.** Chemische Untersuchung über Kakke. (Japanese text, German abstr., Hft. 6.) *Mitt. d. med. Gesellsch. zu Tokyo*, 1905, xix.
- Turner, G. A.** Ship beri-beri. *Brit. M. J.*, London, 1905, i.
- Uchermann, Y.** Om beri-beri. *Norsk Mag. f. Lægevidensk.*, Kristiania, 1905, 5, R., iii.
- Vintras, L.** Beri-beri. *Hospital*, London, 1904, xxxvii.
- Wall, J. S.** Case of beri-beri. *Wash. M. Ann.*, 1904-5, iii.
- Winter, H. E.** Observations on beri-beri. *J. Roy. Army Med. Corps*, London, 1905, iv.
- Wright, H.** The successful application of preventive measures against beri-beri. *J. Hyg.*, Cambridge, 1905, v.
An outline of acute beri-beri and its residual paralysis, *Rev. Neurol. and Psychiat.*, Edinburgh, 1905, iii.
- Yamagawa and Yamanai.** (The nature of beri-beri.) *Tokyo, Iji Shinshi*, 1904.
- Yamagawa, K., and Yamanouchi.** Ueber das Wesen der Kakke (beri-beri). *Beitr. z. wissenschaft. Med. u. Chem. Festschr.* Ernst Salkowski, Berlin, 1904.

Correspondence.

THE REVIEW OF HUGGARD'S HANDBOOK OF CLIMATIC TREATMENT.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—While thanking you for the favourable notice of my *Handbook of Climatic Treatment* in your issue of January 15th, may I be allowed a word of comment?

The reviewer says "there are occasional errors, as, for example, the explanation of the comparative coldness of the upper layers of the atmosphere, which is said to be mainly due to the physical law of the expansion of gases." Now this law explains only the rather exceptional case of up-hill winds, but the absorption of heat from expansion under these circumstances would rapidly be replaced by the sun's rays, were it not for the true reason, which is the universal operation of the law of selective absorption. Air, whether dry or wet, is very transparent to short-wave rays, but absorbs the long dark heat waves, such as are radiated by the ground, and therefore acts in the same way as the glass of a green-house, forming a sort of heat-trap. The more dense the atmosphere, the more efficient it is in this respect, and hence naturally the rarer upper regions, being less efficient heat-traps, do not trap as much heat.

"Moist air is a much better trap than dry air, but this does not affect the explanation, as under any circumstances

the upper layers would be to a greater or less extent cooler."

On going again through the literature touching the point, I find that the account given on pp. 17 and 18 of my book states and explains the facts with perfect accuracy, though in a very condensed form. The supposed "error" is the teaching to be found in every treatise on the subject. Loomis (*Treatise on Meteorology*, New York, 1892, p. 41), says: "This decrease of temperature as we rise above the earth's surface is mainly due to the expansion of the air." A. Buchan, in his *Introductory Text-Book of Meteorology* (1871, p. 76, paragraph 208); R. H. Scott in his *Elementary Meteorology* (4th ed., 1887, p. 218); F. Waldo in his *Modern Meteorology* (1898, pp. 208-216); Julius Hann in his *Lehrbuch der Meteorologie* (Leipzig, 1901, pp. 161 and 748-752); Wilhelm Trabert in his *Meteorologie und Klimatologie* (Leipzig und Wien, 1905, pp. 47-48), all give the same explanation.

The reviewer's "true reason, which is the universal operation of the law of selective absorption," explains, contrary to what the reviewer supposes, not the comparative coldness of the upper layers of the atmosphere, but only why the rate of cooling in the lower layers of the atmosphere is not determined wholly by the law of expansion of gases (Hann, *Handbuch der Klimatologie*, 2nd ed., 1897, vol. i., pp. 121 and 261; W. Trabert, *op. cit.*, pp. 21-22.)

In regard to very elementary facts I must confess I had not thought bibliographical references needful.

Through a printer's error a minus sign is omitted on page 47 of the book. The half sentence quoted should run: "the black-bulb thermometer registered 55.5°C.; whilst at the same time the temperature of the snow in the shade was -5.6°C." The absence of the minus sign doubtless warrants the reviewer's supposition that the observer referred to the air over the snow instead of to the snow itself.

Trusting that you will be able to find space for this rather long comment,

I have the honour to be, sir,

Your obedient servant,

WILLIAM R. HUGGARD.

Davos Platz, January 4th, 1906.

[The criticism in question was based, as a matter of fact, on Hann's standard work, quoted by Dr. Huggard, and the following extract from Dr. Ward's excellent translation of Hann (p. 265), will be seen affords ample justification of the criticism:—

"Causes of the vertical decrease of temperature.—The facts of the vertical decrease of temperature have now been considered. It remains to give an explanation of them. It was noted at the close of the chapter on Solar Climate (Chapter VI.), that the storage of heat at the bottom of the atmosphere results from the peculiar behaviour of this atmosphere toward solar radiation. This process has been called *selective absorption*. The radiations of shorter wave-length, including the luminous rays, are less absorbed, but more scattered, while the radiations of greater wave-length—the invisible infra-red rays—suffer a greater selective absorption, and are to some extent altogether prevented from reaching the earth's surface. As solar radiation is very rich in rays of such wave-length as are readily transmitted by the atmosphere, a large proportion of this radiation is available for warming the earth's surface. On the other hand, the 'heat rays' which are emitted from the earth's surface are to a very considerable extent absorbed by the atmosphere, because this is non-luminous radiation, of long wave-length, in the extreme infra-red portion of the spectrum. Thus it is seen that the radiation from the sun passes to the earth's surface through the atmosphere more freely than the non-luminous radiation from the earth passes out again through the atmosphere. In this way, the atmosphere helps to store up heat at the earth's surface, and this process of storage is naturally most effective in the lower strata, which are the densest and contain the most impurities, and is least effective in the rare, dry, and clean air of greater altitudes.

"Therefore the thinner the atmospheric envelope, the less the effect of the atmosphere, and the lower the temperature of bodies within it, which are then exposed to a freer receipt and loss of

radiant energy. The mean temperature of the air must be distinguished from that of the surface which the atmosphere protects. The air temperature decreases with increase of altitude, in spite of the increase in the intensity of solar radiation with the corresponding decrease in the vertical thickness of the absorbing envelope. Exception must be made, however, in the case of an elevated zone of incipient absorption, for which the vertical temperature gradient is nearly zero."

The remark as to the scantiness of bibliographical references referred to the book generally, and certainly not to its treatment of "elementary facts."]

THE REVIEWER.

DR. HARTINGTON'S ARTICLE ON FIT AND UNFIT PERSONS.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—It was with much surprise that I read in page 16 of your Journal, dated the 15th inst., in Dr. Hartigan's article "On Fit and Unfit Persons for Residence in Warm Climates," the following words, "I have purposely excluded the Riviera, having found its climate lowering, treacherous, and changeable, many of its popular resorts insanitary (in flies and smells they could favourably compete with 'Eastern Bazaars' or 'China towns'), whilst, when the mistral blows, the dust is most irritating to delicate throats and bronchi; the sun and sky give them their only advantage over our cloudy land."

This wholesale libel on a number of popular health resorts, both in France and Italy, ought not to pass unrefuted in the forthcoming numbers of your Journal.

I fear that your eminently useful and able periodical is not much read in the Riviera winter resorts, otherwise I am sure you would receive many a protest from the dozens of British doctors, who, like myself, come to this delightful climate year after year on account of its salubrity and other advantages.

As I have visited most of the coast towns between Marseilles and Genoa, and have resided also some years in Western India, I can safely assert that nowhere is there a Riviera town, frequented by invalids, that could, "in flies and smells, favourably compete with 'Eastern Bazaars,' or 'China towns'." Furthermore, I would say that as regards sanitation most of the Riviera health resorts would compare quite favourably with our British watering places. I do not pretend that every town on this coast is as sanitary as it might be. I have yet to meet the Medical Officer of Health in our own land who is fully satisfied with the sanitation of his district.

The thousands of elderly persons and invalids that come out every season to the brightness and beauty of this coast, thereby loudly attest to the advantages they derive from being free from fogs, frosts, and other failings of our less favoured land. Is it likely that these visitors to the sunny south would banish themselves from their homes and friends, incurring thereby no small expense, if, as Dr. Hartigan says, the climate was lowering, treacherous, and changeable?

No one is likely to find a perfect winter climate, but for accessibility from Great Britain, for salubrity, warmth, and many other advantages, I know of none equal to that of the Riviera, and I often flatter myself that I have chosen one of the best of the North Mediterranean resorts.

I know something of most of the chief resorts of Italy and Sicily, but have found no climate equal to that of San Remo.

I could add much more, but forbear to burden your columns any further.

I am, &c.,

W. SOLTAU ECCLES,

Hotel Bel Sito, San Remo, Italy.

January 31st, 1906.

ZAMBESI ULCER.

TO THE EDITORS OF THE "JOURNAL OF TROPICAL MEDICINE."

SIRS,—Having just started to read an accumulation of your Journals, I now notice under "Zambesi Ulcer," by Z. E. Ashley-Emile, in the number of September 15th, 1905, a description of common ulcers of the leg, met with in Southern Tropical Africa, of which the writer claims to have discovered the cause in the following words among others, viz., "I may, then, lay claim to the unique distinction of being first in the field in bringing to notice the cause of these ulcers, which has hitherto remained in obscurity, and evaded elucidation by many eminent observers in tropical medicine who have resided in Zambesia." So far as I can recall, the only eminent observers who have resided in that part of the world were the members of the Royal Society's Commission on Blackwater Fever, and it is not likely that they paid any particular attention to this question. The writer may have been the first to describe these ulcers, I don't know, but as to a larva not being known to be a cause of some of these ulcers, and that the point had hitherto remained in obscurity, I must say that I think he has not a wide experience of that part of Central Africa, and of the medical men there. The attacks of this larva are well-known to all, and Europeans frequently get their boys to extract them. I have been asked to extract one from the glans penis. I have a specimen I mounted on a slide, north of Lake Nyassa, over five years ago, and among those who have seen it are Professor (now Sir John) MacFadyean. At the same time I got a native to catch some of the parent fly, and kept a dozen of them in paper for two years, but when I reached England they were too much damaged to be of any use for identification. The common sites for Europeans to be attacked are the various parts of the trunk, and I have taken them from the back of the hand. They are believed to adhere to clothes that have been dried on the grass. I thought it more than likely that specimens of these larvæ had been taken home to the Tropical School by such men as Dr. Daniels. The larva appears to resemble the one the writer quotes as described by Blanchard, and as he has not proved that it is not identical, how can he claim to have discovered it?

The advice with reference to boots, leggings, long grass and houses is impractical and would not be followed; men desire comfort and convenience in these matters at home, and a sportsman cannot avoid long grass; besides, the larva is not such a pest as to require disinfection of the floors.

Finally, I do not think that the majority of ulcers in the situation he describes are started by this larva; natives will generally say they were caused by a knock from a tree-stump. Common ulcers of the legs in Europeans have also been known as "fever sores"; some microscopical work is required on the subject.

I am, Sirs,
Your obedient servant,
J. E. S. OLD, M.R.C.S.Eng.

Aden, February 1st, 1906.

BERI-BERI IN SYLHET, ASSAM.—During the last week of October, 1905, cases of beri-beri occurred in the Sylhet Gaol, and by November 8th 100 cases had occurred with 8 deaths. The deaths are stated to have occurred amongst those of the convicts engaged at the oil mills, which are said to be insanitary. A more liberal diet and improved hygienic environment lessened the number of cases.

EXCHANGES.

Annali di Medicina Navale. Annali d'Igiene Sperimentale Archiv für Schiffs u. Tropen Hygiene. Archives de Médecine Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletín de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Medical Gazette. Indian Medical Record. Indian Public Health. Interstate Medical Journal. Jahresbericht. Jantus. Journal of the Royal Army Medical Corps. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. Journal of Experimental Medicine. La Grece Medicale. Lancet. Liverpool Medico-Chirurgical Journal. London and China Express. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post Graduate. Pacific Medical Journal. Philippine Journal of Science. Polyclinic. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Transactions of the American Microscopical Society. Treatment. West India Committee Circular. West Africa.

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Original Communications.

TICK FEVER.

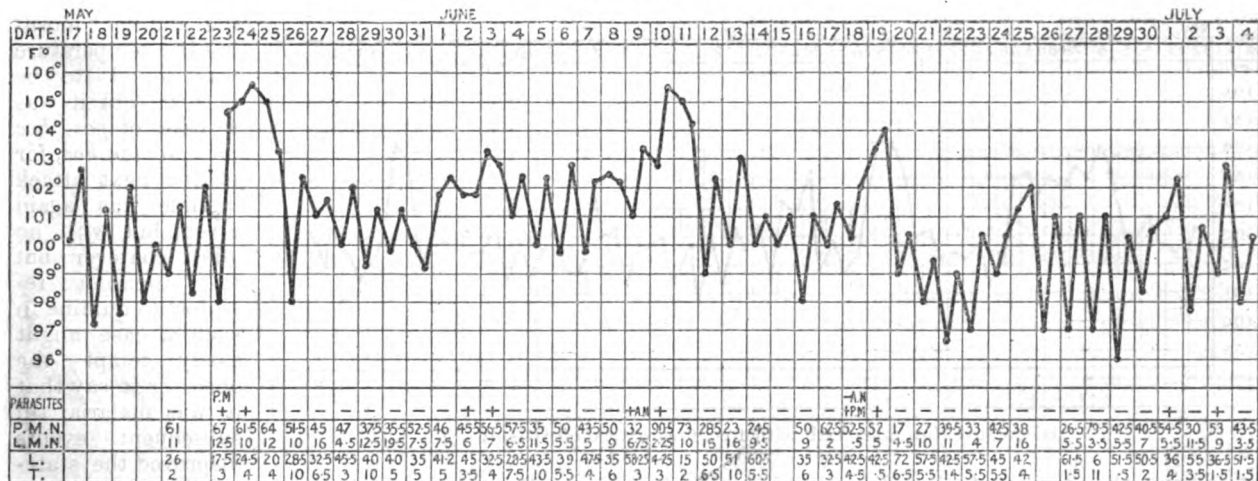
By PHILIP ROSS, M.D.

Definition.—Tick fever of Uganda is a specific fever due to the presence of a spirochæte in the general circulation. This spirochæte is conveyed by the bite of a tick (*Ornithodoros*), but is also communicable by inoculation with infected blood.

History.—Fever due to the bite of a tick, *Argas moubata*, probably an ornithodoros, was first described by Dr. Livingstone. Since this description there seems to have been very little written on the subject. Manson, in his "Tropical Diseases" (1), quotes from Sir John Kirk, and from letters from Dowson and Daniels. More recently Christie suggested that the disease might be due to *Filaria perstans*, inoculated by the bite of an ornithodoros, but the general opinion, as shown by the discussion following a paper by

(*Argas*). On reading this paper it occurred to me that perhaps the spirillosis we had found to be so common in Entebbe was nothing else but tick fever. An opportunity of testing this theory soon occurred, when Milne arrived from Hoima, bringing with him blood slides from eight cases of fever, ascribed by the patients to the bites of ticks. These ticks Milne had already had classified by Theobald as *Ornithodoros Savignyi*, Audouin, var. *cæca*, Neumann (? *Argas moubata*, Murray). On hearing of the possible connection between this disease and spirillosis, Milne most generously handed over all his slides to me for examination, and in every one spirochætæ were found. Some two months after the publication of the paper by Milne and myself (4), Dutton and Todd (5) telegraphed from the Congo that they had succeeded in infecting monkeys with spirillosis by the bite of naturally infected ticks (*Ornithodoros*), and the postscript to Dutton's last letter announced that he had infected monkeys by feeding newly hatched ticks on them, thus

CHART I.



NOTE.—The sign — = No parasites found in blood.

+ = Many " " "

+ = Few " " "

+ = Very few " " "

+ = One parasite " " "

P.M.N. = Polymorphonuclear leucocytes.

L.M.N. = Large mononuclear " "

L. = Lymphocytes.

T. = Transitional.

MONKEY, No. 34. — Inoculated 1 cc. finger-blood from patient during first relapse. May 17th, 11 a.m. Incubation period, 6 days. Intervals (1) 8 days; (2) 5 days; (3) 7 days; (4) 11 days; (5) 1 day. Differential count May 7th, i.e., before inoculation: P.M.N. 20.5; L.M.N. 19; L. 56; T. 5.5.

Nuttall at the Epidemiological Society towards the end of 1904, seems to have been that the disease was probably a piroplasmosis. Towards the end of 1903 I found spirochætæ in a case of fever under the care of Dr. Hodges at Entebbe (2), and succeeded in infecting a monkey from this case. Within a few weeks Cook, of the C.M.S. Hospital, Mengo, also found spirochætæ in a fever patient. This latter writer had probably seen but not recognised the organism some two years before.

Nuttall had previously suggested that the spirochæte of relapsing fever might be conveyed by such insects as bed-bugs, and in September, 1903, Marchoux and Salimbeni (3) described the spirillosis of fowls common in Rio de Janeiro, and, further, showed that the disease was conveyed by a tick

proving the hereditary transmission from parent tick to offspring through the egg.

The most recent work on the subject of spirillosis is contained in the paper by Borrel and Marchoux (6), who show that at 35° C. the spirochætæ of fowls develop in the body of the tick, which latter suffers from a true spirillosis. At 18 to 20° C. the parasite does not develop, but even after months of starvation, exposure to the higher temperature will cause the increase of the parasite and consequent infectivity of the tick.

THE DISEASE.

Incubation Period.—The incubation period seems to be from two or three to eight days. The periods of one day given by some natives are probably wrong, and are only the interval since the patient observed

The blood examination will show a relative increase of polymorphonuclear leucocytes. There may also be an increase of large mononuclears, but this latter is of little value in malarial countries.

To sum up, the diagnosis can only be made with certainty by the examination of the blood. The leucocyte count may perhaps give the right clue, and the lack of reaction to quinine may exclude malaria.

Staining.—Leishman's stain is perhaps as convenient as any, and has the advantage over some other stains in that it permits a leucocyte count to be made. Actually the best stain for the parasite is dilute (1 in 3) aniline-gentian-violet for three or five minutes in alcohol or alcohol and ether.

Inoculation.—If a monkey is to be infected the finger-blood may be drawn up into a hypodermic

it comes out in search of food, retiring again when it has fed.

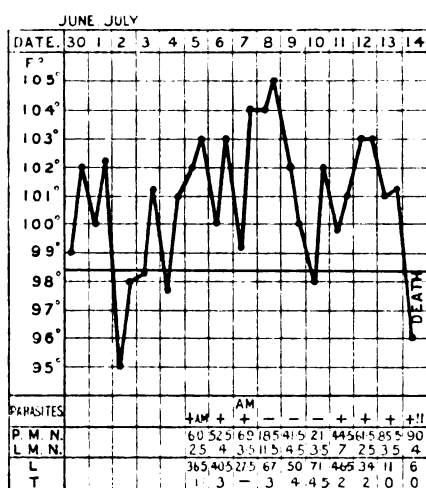
In a country where tick fever is known to exist old camping grounds should be avoided, and native porters and boys should be warned not to use old huts to sleep in. Huts known to be infected should be burned. Europeans will be practically protected by their mosquito nets, provided these be arranged so that they can be tucked in beneath the bed-clothes. Nets with shot-weighted edges to drop to the floor are more likely to be a help to than a protection against the ticks.

It is possible that the reason why natives do not suffer from relapses as do Europeans is connected with their house arrangements. A native living in an infected hut will be constantly subject to reinfection. If, as in other spirilloses, the immunity conferred be only temporary, the native when recovered from one attack will be immune for some time. As the immunity becomes less he will be liable to fresh infection, but it seems likely that the previous attack will have increased his resistance to the disease, and may thus be the cause of the absence of relapses.

THE EXPERIMENTAL DISEASE.

The subcutaneous inoculation of a drop or two of blood from the finger of a patient during fever into a monkey (black-faced or Sykes' *Cercopithecus*, or *Cynocephalus*) is sufficient to produce a disease exactly resembling the disease as seen in Europeans. After an incubation period of from two to six days the monkey's temperature rises to 104° to 106°, the animal is found sitting about resting its head

CHART II.



MONKEY No. 43.—June 30th, inoculated 1 cc. finger-blood from monkey No. 39. Incubation 4½ to 5 days. Duration of first attack, 3 days; interval, 3 days. Duration second attack, 4 days. On fourth morning found prostrate, temperature sub-normal, blood swarming with parasites. Death.

Fowl and dog inoculated with 5 cc. heart-blood, but showed no reaction, and no parasites could be found.

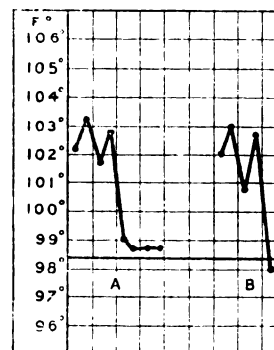
Post Mortem.—Lungs, a few very small infarcts. Heart, a few very small infarcts. Spleen rather large, firm, infarcts on surface. Liver rather large, congested, infarcts on surface. Kidneys congested. Lymph glands uniformly enlarged, some of them hæmorrhagic. Brain a little surface congestion, no infarcts.

syringe in which there has been placed a drop or two of a 1 per cent. solution of potassium citrate. The mixtue is injected subcutaneously.

Treatment.—No drug seems to have any effect either in shortening the disease or relieving the symptoms. All that can be done is to feed the patient in the intervals between the relapse. If a febrile period is prolonged it may be necessary to have recourse to rectal feeding. When convalescence sets in the patient may be given some ordinary tonic, and should be ordered rest and good food.

Prevention.—Prevention is easy for Europeans, but becomes difficult when dealing with natives. The *ornithodorus* lives by day in the thatch or in cracks of mud floors and walls of old native huts. At night

CHART III.



A. Disease in native. Recovery.
B. Disease in native. Death.

on its hands or against the wall of the cage, and evidently feels very ill. In a typical case, after a variable time, usually two to four days, the temperature, which during this time has remained high, falls abruptly to normal, and the animal appears quite well. In five or six days there is again a rise to 104° to 106°, lasting, as a rule, a couple of days, then falling as before. As in the European, there cannot be said to be any regularity either in the duration of the febrile period or in the length of the interval. The fever may persist for nearly a week or last but a day, and the intervals vary between one and eighteen days, but in the later relapses there is a tendency for the

febrile period to be shorter and for the temperature not to rise so high. The animal also is not so evidently ill as during the earlier attacks.

Blood Examination.—If the blood of a monkey be examined when the temperature is first found to be rising it will be found to be swarming with spirochætae. These are rarely found single, but when so found they are twisted and contorted to a degree not seen in the regular wavy organism seen in man. Usually they are in tangled masses of from four or six to many hundred individuals. Division forms are fairly common. In the fresh blood specimen the parasites are as a rule hard to find in man, but in the monkey they are present in such quantities as to be easily made out. If a single organism can be seen when temporarily arrested in its course its movement resembles nothing so much as that of an archimedean drill. When free it moves much too rapidly for the observer to gather any very clear idea as to its movement. The disturbance of red cells is slight, much less than that caused by a trypanosoma or filaria.

The organisms can easily be found till the crisis, when they disappear even more suddenly than they appeared. In the later relapses the parasites are present in less number than in the earlier attacks, but their behaviour is similar in all respects.

After the first day or two of fever nucleated red cells are found in fair numbers. They persist in the blood till the termination of the illness, and a few may still be found some weeks after the last relapse.

Leucocyte Count.—After inoculation there appears a gradual rise of the polymorphonuclear leucocytes. When the attack sets in there is rather a marked leucocytosis, with a large relative increase of the polymorphonuclear cells at the expense of the lymphocytes. This leucocytosis persists till the crisis, and may become extreme just before the crisis, every microscopic field showing large numbers of leucocytes, especially of the polymorphonuclears. Immediately after the crisis there is a sudden reversion to the original leucocyte count, and this persists till the relapse. A point of interest is that in the later stages of the disease it is sometimes found that the polymorphonuclear increase occurs, although there is no rise of temperature. In two of such cases I have found that long search through a slide has shown the presence of a very small number of spirochætae. I am inclined to think that in such cases there has really been a relapse, but that it has been so slight that the resistance of the patient being increased by previous attacks, so far as the temperature is concerned, it has proved abortive. Such an attack would probably be comparable to Hodges' case, referred to above, where the parasite appeared in the blood without any rise of temperature, the only sign of relapse being the severe headache.

The mechanism of the crisis in spirillosis has been much discussed, especially by the French working with the parasites of relapsing fever, and of fowls and of geese. Metchnikoff (7) and Cantacuzène (8) are of the opinion that the phagocytes are the agents of the crisis—in relapsing fever the polymorphonuclears, in spirillosis of geese, the macrophages of the spleen. Gabritschewsky (9), on the other hand, ascribes the crisis to the formation of bacteriolysins in the blood

serum. Working with the Brazilian disease, Levaditi (10) concludes that in refractory animals the formation of antibodies takes place in the leucopoietic organs, especially in the spleen, bone-marrow, and lymph glands, and the leucocytes should be considered as the principal if not the exclusive source of the antibodies. But in animals suffering from the disease he concludes that "la disparition des spirilles pendant la crise, ne saurait reconnaître l'intervention d'une sensibilisatrice spécifique, considérée comme agent bactériolytique"; and further, "les observations faites sur la septicémie de Marchoux et Salimbeni sont ainsi d'accord avec les constatations de Metchnikoff et de Cantacuzène concernant la fièvre récurrente et la spirillose des oies, pour accorder aux leucocytes une influence de premier ordre dans la guérison spontanée des animaux." The phenomena seen in the Uganda disease would appear to bear out the importance of the part played by the leucocytes. The polymorphonuclear leucocytosis coincides with the appearance of the parasites in the blood, and ends at the crisis which coincides with their disappearance. In both polymorphonuclear and large mononuclear leucocytes clear spaces can be seen, and sometimes, though rarely in the peripheral blood, this space is seen to contain a parasite. In smears of organs after death, especially in smears from the liver and lung, this appearance of parasites, engulfed by the leucocytes, is exceedingly common. After the crisis the vacuoles can still be seen in the large mononuclears, but not in the polymorphonuclears. Where the crisis is due to the formation of bacteriolysins one would expect that the parasites would show loss of motility, signs of degeneration, as shown by change of staining reaction and diminution of numbers. No one of these phenomena is, however, observed.

A marked feature in blood taken during the febrile period is the appearance of the polymorphonuclear leucocytes. Many of these appear to have been so damaged that the mere act of spreading the film converts them into an indefinite mass of nuclear material and granules. In others whose outline is still distinct, there is a marked rearrangement of the nucleus; instead of being rather compact in the centre of the cell, it tends to arrange itself peripherally, leaving a granular space in the middle of the leucocyte. The outline of such cell is much less definite than that of the normal cell.

Death.—Death usually takes place during an early relapse. The temperature of the monkey falls below normal, but the animal does not show the expected improvement. A blood slide taken now will show swarms of spirochætae, and an enormous leucocytosis. The animal becomes comatose and dies in the course of a few hours.

Post mortem.—The changes found after death are slight.

The lungs show small infarction areas.

The liver is rather large and congested.

The splenic enlargement is slight, and the splenic substance is firm and not at all friable.

The lymph glands are enlarged and some of them are hæmorrhagic.

The brain shows no change.

The heart shows petechiæ in its wall.

Smears of the organs show most parasites in liver,

lung and kidney, and fewest in spleen, brain and lymph glands.

There cannot be said to be anything characteristic in the *post-mortem* appearances in the monkey, any more than there is in man.

It is only recently that I was able to attempt experiments with the ticks. After Dutton and Todd's results in the Congo, I was surprised that the experiments failed, but Borel and Marchoux offer a ready explanation of this in their paper. If the spirochæte does not develop in the tick at 18° to 20° C., it is probable that the tick brought from the moist warmth of Uganda to the cool days and cold nights of Nairobi ceases to be infective, and I expect to have to use the incubator to get any results.

REFERENCES.

- (1) Manson, "Tropical Diseases," 1903, p. 713.
- (2) Hodges and P. H. Ross, *B.M.J.* April 1st, 1905.
- (3) Marchoux and Salimbeni, *An. de l'Inst. Pasteur*, September, 1903.
- (4) Ross and Milne, *B.M.J.*, November 26th, 1904.
- (5) Dutton and Todd, *B.M.J.*, February 4th, 1905.
- (6) Morrel and Marchoux, *C. R. Soc. Biologie*, February 25th, 1905.
- (7) Metchnikoff, *Virchow's Arch.*, vol. cix.
- (8) Cantacuzène, *An. de l'Inst. Pasteur*, 1893.
- (9) Gabritschewsky, *Centralb. für Bakt.*, vols. xxiii., xxvi., xxvii.
- (10) Levaditi, *An. de l'Inst. Pasteur*, March and August, 1905.

NOTES FROM NORTH NIGERIA.

LIVER ABSCESS, FILARIA, CEREBRO-SPINAL FEVER, BILHARZIA, SPIRILLAR FEVER.

By Dr. DAVID ALEXANDER.

[The following is abstracted from a letter dated December 9th, 1905, sent by Dr. Alexander to Dr. Andrew Davidson, Lecturer in Tropical Diseases, University of Edinburgh, to whom we are indebted for forwarding the communication.—Ed., *J.T.M.*]

It may interest you to know, although it has not been published yet, that a friend of mine who has been doing special work in connection with amœbæ, their cultivation and relation to liver abscess, has been able to cultivate them, and has produced liver abscess; this, no doubt, will appear in print soon, unless he discovers some fallacy.

None of the subjects in whom I found *F. perstans* had any illness that could be traced to it, but then consider the number of those who have *F. nocturna* that have no illness either. All the cases I found *F. perstans* in had been in Ashantee: so far I have not got it in any local native yet.

I am surprised that there has been no appearance in print yet of the Principal Medical Officer's report on the cerebro-spinal epidemic. It is endemic and epidemic apparently all over West Nigeria, although I am told that there are no cases up here. At Kano there were a great many cases; deaths include one white man. Kano is 100 miles from here on the one side, and at Sokoto on the other side there were also cases. They also had the epidemic at Yola, so it was present at both extremities of the Protectorate. The natives connect it, somehow, with small-pox, and say that when small-pox is not bad, it is bad. It appears

towards the end of the dry season—February, March, and April—and ends with the first rains. None of the attendants that we employed got it, and cases in a town were very irregular in their occurrence; one case here, and the next in a house perhaps 600 to 800 yards away. I never saw a case at home, but it exactly tallies with the description in the text-books. Some of the cases I was inclined to look on as epidemic pneumonia, but probably I was wrong; anyway, we had no differential stains.

Bilharzia I have not come across yet, but that it exists in West Nigeria is certain. Dr. Watson, who made one or two tours in Bornu, tells me he saw it there. (That is Watson of the new *Amphistomum Watsonii*.) Mosquitoes there are many; I have not done much in the way of identification of them.

Spirillar fever I am on the look out for; the ornithodorus is here, and possibly I may have a case. I make a habit of staining a slide from nearly every fever case with carbol-fuchsin, on the off chance of spirilla.

In a note of later date, Dr. Alexander adds:—

I ought not to have said the ornithodorus is here. I described what I wanted to a rather intelligent native, and he said that he knew what I meant, but to-day he brings me in the ordinary bed-bug. However, I may get it yet.

"Indian Med. Gazette," February, 1906.

PREVALENCE OF YAWS IN THE CHINDWIN DISTRICT OF UPPER BURMAH.

Military Assistant Surgeon, P. A. McCarthy recalls that the presence of yaws in this district was first noted by Mr. A. A. Nolan in the *British Medical Journal*, February 2nd, 1895. The disease is known by different names in different townships, some speaking of it as leprosy, and others by descriptive names, such as "crippling disease," "molehill disease," and so on. This variety of names certainly appears to indicate a recent origin, and there is a tradition that it was introduced from Siam via the Mergui coast and Chindwin River, and the fact that it is rarely found in inland villages would appear to support the tradition. He considers that the mode of communication is usually by direct inoculation of some breach of surface, and met with it at all ages, from three months to three-score years.

The period of inoculation, though uncertain, he considers to be about three to eight weeks. The author then describes the lesions and course of the disease, which certainly appear to support his opinion as to the identity of the disease with that known as "yaws" in other parts of the world.

He gives some interesting information as to the method of treatment adopted by the native practitioners, or *sayahs*, who employ crude mercury, and occasionally red arsenic. Mr. McCarthy himself used a mixture of hyd. perchlor. and pot. iod. in the secondary stage, and soda lotion, and occasionally sulphate of copper, to the granulomata locally.

In a letter to the editor of the same journal, Lieut.-Col. W. A. Lee, I.M.S., referring to Major Childe's paper on the occurrence of Leishman-Donovan infection in Europeans, states that, unlike Childe, he finds the disease by no means uncommon in Europeans in certain parts of the town of Madras, and draws attention "to the value of carbolic acid, which should be given for a prolonged period, and in gradually increasing doses, to the utmost limits of tolerance." Some of his cases received "as much as 3 drachms daily, with ultimately beneficial results, and without any drawback, such as carboloria, occurring."

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THE

Journal of Tropical Medicine

MARCH 1, 1906.

THE DEPRECIATION OF THE ATTRACTIONS OF THE INDIAN MEDICAL SERVICE AND ITS REMEDIES.

II.

IN our first article on this subject we drew attention to two causes of dissatisfaction, viz., to the want of encouragement to professional zeal and research, and to the hardships of the superannuation rules, which render it practically impossible for any man who has devoted an adequate time to his student career to reach administrative rank. In the present, we propose to touch on a matter which, though of mainly sentimental interest to the individual members of the Service, is of vast practical importance to the State, as it lies at the very root of the inefficiency of Indian sanitary reform, and in many other directions impairs the efficiency of our medical institutions. We allude to the lack of proper status and influence in the councils of the Indian Empire. Politically speaking, the Surgeon-General with the Government of India is

a sort of expert adviser to the Secretary to Government in the Home Department, and when matters of sanitary and medical import have to be dealt with, the latter official may or may not ask medical advice, and, in either case, is perfectly at liberty to ignore it, and probably as often does so as not. Owing to this the position of the Surgeon-General is most unenviable ; for the general public, knowing nothing of the gearing of the bureaucratic motor, naturally imputes any blunders that may be committed to him, though they may in reality have been made in defiance of his strongest protests, while official etiquette renders it impossible to utter a word to clear his professional reputation. Nothing can better illustrate the powerlessness of the medical service in the direction of sanitary affairs than the history of the methods of the Indian Government in dealing with plague, of which the following is a short sketch. It may be admitted that the most recent pronouncement of the Simla secretariat on the subject, which we reproduce in another column, is by far the most satisfactory that has been hitherto issued by that august body. One might, in reading it, almost imagine that Simla had taken medical advice on the subject, instead of treating their medical experts as persons most of all likely to take an ignorant and prejudiced view of the question ; for hitherto the ways of the Indian Government in the campaign against plague have generally appeared to be based rather on shortsighted notions of expediency than on what might be expected to be the views of their sanitary advisers.

The history of plague prevention in India, however, has been one long series of blunders and mistakes of a sort that could hardly have been committed had the sanitary authorities been trusted to make their own arrangements.

No doubt, at the time of the importation of the disease, the medical profession in India knew practically nothing of plague, but it had had ample experience in dealing with other epidemic diseases, and its intimate personal relations with the native population made it better qualified than perhaps any other branch of the public service to judge what measures would command the loyal co-operation of the people and what would irretrievably offend its prejudices.

As the fact was well known to all epidemiologists that all forms of inland quarantine had hitherto proved powerless to arrest disease of any kind, and as no one understood the ultra-sacredness of the Indian home better than the members of the medical service, it is hardly likely that it can be held responsible for such costly absurdities as sanitary cordons, and train inspections ; or for the tactless folly of house-to-house inspection carried out by European soldiers, literally at the point of the bayonet.

The first step in this melancholy tale of misdirection was the ostrich-like one of trying to ignore the presence of the disease in Bombay ; and in this way the critical days were wasted, during which stringent measures of isolation and disinfection might possibly have arrested the further spread of the disease. It required no special knowledge of plague to suggest such measures as are required at this stage of an epidemic, as they are self-evident, and have since averted invasion in many parts of the world.

The disease now spread rapidly, and the Government, becoming frightened, attempted to "stamp out" the disease. To this end a Commission, vested with extraordinary powers, was appointed; directed, not as might be expected, by a sanitary officer of proved experience, but by a combatant military officer, who, it may be incidentally remarked, has since proved none too competent, even in his own profession.

Of this Commission the medical officers were simply the agents and subordinates, and its proceedings were of so outrageous a character that, looking back on the time, it is surprising that murder and riot were not even worse aroused than was actually the case; for as if to accentuate its folly the Indian Government appointed, not an officer of the Indian Staff Corps, but one of the British Service who could not by any possibility be acquainted with native prejudices and ideas.

An officer who had grown grey in the sanitary department, who passed through Bombay at this period, remarked at the time to the writer, that he would have lost all respect for the natives of India had they not broken out into riot under the provocation they were receiving.

The mischief wrought by this outburst of mad militarism has been irreparable, as all subsequent measures of the Government, good, bad and indifferent, have been viewed with such suspicion by the native population that it has been impossible to obtain their co-operation, even where they have not resorted to active or passive opposition.

Terrified by the storm it had raised, Government rushed to the opposite extreme, and instead of trusting to the individual tact of its officers to do the little that it had left possible, tied their hands by minute and stringent regulations. To save its face the portentous farce of train inspections was now paraded as the principal line of defence. The medical officers employed on this duty were supposed to examine several hundred people during a halt of fifteen or twenty minutes, and in order to avoid arousing further ebullitions of violence, were, moreover, forbidden to make any sufficient physical examination.

Assuming the patient to be still able to stand, it was in the last degree unlikely that a case could be detected.

Anything more hopelessly futile and harassing than the duties thus thrown on the medical officers employed on the work it would be hard to conceive, and it is probable they were the only people who were more disgusted with the folly of the system than the unfortunate passengers (native and European) who were worried every hundred miles or so by their obviously useless inspections.

Another vagary of this period, born of the desire to appear to be doing something, was the order of a provincial government, that in the chief town of each district every house should be inspected by the Civil Surgeon. The cubic space of each room was to be measured and sanitary recommendations made to each householder. Several of these towns possessed over 25,000 houses, and probably none had less than 3,000 or 4,000, so that the impossibility of a single man, already busy with a multiplicity of duties, carrying out such a task in any reasonable time, even in the smallest places, is sufficiently obvious. As a matter of fact, nothing but

rebuilding could convert these oriental houses into sanitary dwellings, and the Government, even if unable to understand this, must have been perfectly aware that nothing whatever would come of the Civil Surgeon's recommendations. What the secretariat evidently did not understand, however, was that the circular, if taken literally by the medical executive, could scarcely fail to cause opposition and rioting. Fortunately, there was hardly an officer in the provincial medical service who had not the tact to practically ignore the order, for every one knew that a broken head and an official reprimand for want of tact was all they were likely to earn by taking seriously such a piece of buffoonery. In one great town, however, it was so obvious, even to the wisecracks at the helm, that the job was more than one man's work, that he was given a couple of youngsters fresh from home to help him in the task. Presumably these energetic recruits must have been so inexperienced as to believe that Government orders should always be taken *au grand sérieux*, for the result was serious opposition, and it was even whispered, disaffection in a native cavalry regiment, though the rumour may be doubted.

Then urgent telegrams went flying over the country, "Cease house-to-house visitation at once." There was probably not a district medical officer in the province who, if asked his opinion, would not have told the authorities that, apart from its futility, such an order was in the last degree impolitic, and it is most unlikely that the very able man who was nominally the administrative medical officer differed from his colleagues on the point. What he may have thought, however, matters nothing, for in any case his powers, whether of action or protest, were practically *nil*.

It would occupy too much space to give a complete history of the later developments of the campaign, beyond saying that of late years the policy has simply been to "let things slide," but enough has been written to show that the course of action has not been what would be expected of men accustomed to deal with epidemic disease in any form, or of officers who in any way understood what sanitary measures are, and are not practicable in dealing with a population whose prejudices are as peculiar as that of India. To thoroughly understand the caste system would probably occupy the lifetime of several German professors, but in the course of fifteen or twenty years' work a sanitary officer attains a fair working knowledge of how to get the maximum possible, under the circumstances, of sanitary effort, and it is the systematic ignoring of this invaluable source of strength that is responsible for the hopeless fiasco that we have attempted to describe.

The old caution of *ne sutor ultra crepidam* is as applicable to attempts on the part of the civil and military executive to deal with sanitary matters as to the cobbler's criticism of the artist. It is not for a moment pretended that the Indian sanitary officials, even if placed in authority, could have succeeded in arresting the advance of the pestilence, but it is certain that no one accustomed to dealing with the native population when attacked by epidemic diseases would have been guilty of the follies that have been described. At least the lacs of rupees

wasted, or hopeless attempts at inland quarantine train inspections, and similar expedients, would have been saved, and we may be sure that coercion would have figured but little in the programme, and if employed at all would have been confined to enforcing the evacuation of infected sites in cases where local circumstances rendered such a measure practicable.

In this way the road would have been smoothed for more effectual measures, when advancing knowledge indicates more promising lines of defence. The remedy lies in giving the Surgeon-General with the Government of India a seat on the Vice-regal Council, and the Inspectors-General of Civil Hospitals one on the Provincial Governments.

It is to be feared, however, that the Indian Government hardly desires to place its sanitary advisers in a position of proper trust and authority, as it is haunted by the fear that this would lead to what they would regard as undue expenditure on sanitary projects.

In reality it would be more likely to result in considerable saving, as no men know better how little can really be done in the present state of civilisation of the indigenous population.

Formerly the Director-General was entitled the "Sanitary Commissioner and Surgeon-General with the Government of India"; but a few months back a great flourish of trumpets was indulged in over the separation of the officers and the appointment of a separate Sanitary Commissioner. In reality, however, the step was a retrograde one, for by a subtle turn of policy the appointment was laid open by "selection" to any grade of the service, and the Government selected a quite junior officer, who, moreover, had had no practical experience whatever in the work of the Sanitary Department, but had been employed for the most of his service in a secretarial post. It is absurd to suppose that so junior an official, however able, could possibly carry sufficient weight to enforce his opinions on a body of veteran "big-wigs" such as constitutes the hierarchy of Simla, and the selection is really an evidence that the latter had no desire to find a medical Kitchener amongst them. A seat on the Council would, however, enable the holder to show that medical officials can be as practical and moderate as other branches of the Service, and would enormously facilitate the progress of such sanitary reform as is practicable under the peculiar conditions of the country and its people.

BODIES IN THE SPUTUM AND FECES RESEMBLING THE EGGS OF PARASITES.

DR. WILLIAM HARTIGAN forwarded for inspection peculiar bodies coughed up by a patient in the presence of a medical man practising in the north of Ireland. Of the bodies in question, some to the naked eye resembled ova, and were fairly uniform in size; some resembled freshwater cyclops in their outline and appearance; the remainder, seemingly, consisted of fragments of the above. The bodies in question were submitted for examination to Dr. C. W. Daniels, the Superintendent, and to Dr. C. M. Wenyon, Protozoologist at the London School of Tropical Medicine. The bodies in question were found

to be merely mucous casts, modelled, no doubt, in smaller bronchi of the lung.

This observation is interesting in itself, and in view also of the note by A. Chauffard, in the *Presse Medicale* of January 10th, 1906, referring to the eggs of parasites simulated by pollen in faecal matter. The ovoid bodies described by Chauffard appeared to be ova, but as they did not resemble the ova of any known parasite they were submitted to a searching investigation, when they were determined to be grains of pollen from a coniferous plant.

J. C.

A SIMPLE GUIDE TO THE PRESERVATION OF HEALTH
IN SOUTH AFRICA. By H. Strachan, C.M.G.,
M.R.C.S., L.R.C.P., P.M.O. Lagos West Africa.
Second Edition.

This is a short pamphlet of no more than seven pages, published locally, it is presumed for gratuitous distribution; but it would be difficult to find elsewhere so much sound advice compressed into so small a space. Though written primarily for the assistance of Europeans residing in West Africa, it is almost needless to say that nine-tenths of its *dicta* are equally applicable to India and other tropical lands.

Though no more than a page and a half is devoted to precautions against malaria, it is astonishing how much has been included in the space; and we are glad to see that Dr. Strachan strongly recommends the adoption of mosquito-proof rooms. He admits that the gauze screens obstruct to some extent the free circulation of air which is so essential to comfort; but points out that "the extra safety to health is worth the extra inconvenience caused by a slightly increased degree of heat." There is, however, no reason why houses should not be so built as to be as comfortable as it is possible to be in such a climate in spite of their being made mosquito-proof.

The remedy lies in increasing the size of the windows and other openings so guarded.

West African houses are, however, usually extremely badly planned in this and almost every other respect of fitness for the climate they have to withstand; but, doubtless, in West Africa, as elsewhere, sanitarians such as Dr. Strachan have little or no opportunity of criticising the plans drawn up by the engineering authorities, and so have to make the best of the latter's bad jobs, after they have become accomplished and costly facts. Provided a room be designed with large openings coming down nearly to the floor, and that the house be so planned that a thorough current of air is possible, there is no reason why breeze enough to blow the papers off the tables should not find entry through wire gauze. We are glad to see, too, that Dr. Strachan recommends the *periodical* and not the *chronic* use of quinine as a prophylactic against malaria, in the form of a full dose (10 grs. quin. sulph., or 6 grs. of hydrochlorate) on two consecutive days weekly. There can be no doubt that the chronic quinine taking, which is so often recommended and practised in West Africa, has a most harmful effect on the nervous system, and indirectly on the general powers of resistance to truly climatic influences; and

that in view of the life-history of the parasite it is quite needless to dose one's self more frequently than is recommended by Dr. Strachan.

Much of the pamphlet is naturally taken up with the management of tanks. Foreign as it may be to the popular idea of West Africa as a pathless swamp, the actual facts of the case are that the rainfall is by no means excessive for an equatorial climate, and that some of the most obtrusive discomforts of the country are the outcome of its liability to prolonged periods of drought. The surface wells are bad, and in the absence of regular waterworks, rain-water tanks with all their admitted liability to pollution are the sole available supply.

In some years the practically rainless period may extend to four or five months, even at Lagos, and to much more than this at Accra, so that the sort of stuff that is left at the bottom of the tanks at the end of such a period may be easily imagined, especially before their management was taken in hand by thoughtful sanitary experts of the type of the author of the pamphlet. While, however, the climate is to be considered as a somewhat dry rather than a wet one when compared with the majority of countries in the same latitude, its annual rainfall of 73 inches scarcely qualifies it to pose as a Sahara, and makes it certain that there must be plenty of good water to be got by paying for it. The solution of the difficulty lies with the financial authorities, as the engineers have no doubt excellent plans ready for adoption if only sufficient money be forthcoming. Let us hope that these monetary difficulties will soon be surmounted; for a good and ample water supply is everywhere the first essential of sanitation, and the possibilities of "the Coast" in the matter of health can never be fully realised until Dr. Strachan is able to even further abbreviate his pamphlet, by cutting out his excellent hints as to the management of rain-water tanks, on account of the latter having been replaced by regular water supplies in all centres of population.

THE CULICID FAUNA OF THE ADEN HINTERLAND.

By Lieutenant W. S. PATTON, I.M.S.

(Reprint from the "Journ. Bombay Nat. Hist. Soc.," November, 1905, p. 623.)

THIS paper is a valuable contribution to our knowledge of what may be termed the Medical Zoology of a portion of Southern Asia, that up to now has been almost unexplored from this point of view.

Hitherto the whole of Arabia has been a *terra incognita*, and, with small reservations, the same remark applies to Somaliland and the shores of the Persian Gulf.

We must confess, however, that we should not have expected to find the Culicid fauna consisting so largely of new species.

Of the five *Anophilina* described, all are claimed as new, while one of the seven species of *Culicines* has also not been hitherto described.

The region is, however, a desert one, where the area of distribution of species would naturally tend to

be circumscribed, and into which opportunities for the importation of the forms of neighbouring countries must be rare.

The descriptions are full and for the most part excellent, and the figures, though very rough, intelligible. The important detail of the banding of the legs is not, however, described in sufficient detail.

We are not quite clear whether the author adopts the classification of James and Liston, or that of Mr. Theobald, as some of the species have the latter's genera inserted in brackets after "*Anopheles*," while others have not.

One of the new species, "*Anopheles (Myzomyia) Jehafi*," is described as having the thorax "covered with brown-curved scales." Now it is a characteristic of Theobald's genus *Myzomyia*, that the thorax, except occasionally on the fore-edge of the mesonotum, should be devoid of true scales, as the chitinous appendages of this region are hair-like, and for practical purposes may be regarded as hairs. The term "curved scale" has a special signification in Mr. Theobald's system of classification, and if it can be correctly applied to those covering the thorax of this species, the genus has been wrongly assigned. The description, in fact, throws it into *Pyretophorus*, where I see the author notes it was placed by Mr. Theobald, who "suggested it might possibly be *A. cinereus*, Theobald." Judging from the plate of the wing I should say it was referable to that species.

It is similarly noted that Mr. Theobald identifies this author's *Anopheles Arabiensis* as his *A. Welcomei* from the Soudan. Now Mr. Theobald is none too loth to make new genera and species, and on such a point as the identification of one of his own species most would prefer to take his *dictum* to that of any other authority, and any attempt to unnecessarily lengthen the already bewildering list of species is much to be deprecated.

Lieutenant Patton did not come across Theobald's *Cellia Pharoensis* during his researches, though the latter notes that it had been sent him from the Aden hinterland.

There is nothing surprising in this, but, curiously enough, the author evidently considers that Theobald must be referring to some of the specimens sent to the latter by himself, and does not seem to see that they must have been contributed by some other collector.

These, however, are details which need not diminish our congratulations to the author on a good and painstaking piece of work.

G. M. G.

Abstract.

TROPICAL AUSTRALIA—IS IT SUITABLE FOR A WORKING WHITE RACE?

By J. S. C. ELKINGTON, M.D., D.P.H.

TROPICAL Australia comprises rather more than one-third of the entire Commonwealth territory. One-half of Queensland, 523,620 square miles of the Northern Territory, and the north-western divisions of Western Australia, are included, totalling in all some 1,145,000 square miles. The country ranges from the Pacific to the Indian Ocean, includes practically

all ordinary varieties of tropical climate, and is dominated by the monsoonal winds. The greater part of it lies between 600 and 1,500 feet above sea-level, but extensive plateaux exist, covering many hundreds of square miles, at an elevation of over 1,500 feet, and ranging in Arnheim Land to 3,000 feet and over. Sufficient reliable physical cartography has been carried out in Northern Australia to effectively dispose of the old idea that the Northern Territory is a vast mangrove flat, and the remainder an arid waste of sand at or near sea-level. Elevation materially modifies climate, and the breezy tablelands of eastern North Queensland at least afford for many months of the year as "bracing" an atmosphere as can be found anywhere in the world.

Drought is a rare phenomenon in the monsoonal area, and the great northern rivers testify to the abundance and regularity of the annual revivification from this cause. These also afford waterways for considerable distances into the interior, and drain extensive areas of good pastoral country.

After discussing what are the objections to the settlement of a white race in tropical Australia and the problems to be faced, Dr. Elkington concludes as follows:—

"The future of tropical Australia appears to lie in the common-sense of the people, and of their representatives in the Legislature. In its present condition it must continue to form a monument to the lack of enterprise displayed by Australians, and a perpetual temptation to other races and people more appreciative of its varied endowments, and gifted with greater resolution and insight than we appear at present to possess. It is no question to be solved rule-of-thumb fashion by a mere trust in Providence. Tropical Australia should be a prize for the fittest, and if success is desired, every reasonable precaution will require to be taken to insure and maintain that fitness. As one possessing some knowledge of the cost and application of systems of sanitary administration, I am of opinion that this portion, at least, of the necessary administrative organisation will not prove costly, if gradually and sagaciously installed. Concerning its economic value, the facts detailed above will have afforded sufficient indication.

"Before any definite move can be made more will require to be accurately known concerning the topographical and other conditions of the country. From what can be gathered, however, the institution of an enquiry should be amply justified. In this age of land-hunger Australia cannot continue to act as the dog in the manger. Given sufficient industrial attraction, population will soon be forthcoming, and there appears to be no good reason why that population should not be a white one. Should the initial difficulties appear too great, the alternative of a coloured population is always feasible; but I, for one, would regret to think that the national pluck and enterprise upon which we Australians are rather apt to pride ourselves is insufficient to enable difficulties to be faced which have been met and overcome elsewhere under less favourable conditions."

INDIAN GOVERNMENT MANIFESTO ON PLAGUE PREVENTION.

THE following has been issued by the Home Department:

Calcutta, January 18.

"More than five years have now passed since the Governor-General in Council, when reviewing the report of the Indian Plague Commission, examined, in the light of the knowledge then available, various measures which had been proposed or adopted with the object of checking diffusion of the disease, and indicated the considerations of policy which must govern their introduction in India during this period. While the efforts of Government officers have in no way relaxed, and the people themselves have in many places shown a disposition to acquiesce and even co-operate in preventive measures which do not conflict with their social and religious usages, plague has gradually spread to almost every part of India, and subject to certain seasonal fluctuations, tends to recur year after year with undiminished virulence. About a year ago, the Government of India, acting in concert with the Royal Society and Lister Institute, made arrangements for the appointment of a scientific Commission, which is now investigating the causation of plague in Bombay and the Punjab. Pending the completion of these researches, which may extend over a long time, and will in any case be directed mainly to the scientific aspects of the problem, the Governor-General considered it desirable to place on record, in a concise form, the results of practical experience which have been acquired in the last five years of actual plague administration. The Local Governments were accordingly asked for reports based, as far as possible, on the personal experience of their officers, on the conditions affecting the origin and spread of plague, the character of the measures to be adopted against it, the degree of success attained, and the causes upon which success or failure depend. The ample materials thus collected place the Governor-General in a position to indicate those preventive measures which appear, under present conditions, most likely to be successful in the future.

"The most conspicuous change in the opinion of experts in India regarding plague since the issue of the Resolution of July 16th, 1900, is the greatly increased importance now ascribed to the part played by rats in spreading and keeping alive the disease. Rats are exceedingly susceptible to plague, and when once they are infected they usually communicate infection not only to man but also to houses which have undergone a thorough disinfection. It is therefore as essential to the safety of the community to destroy infected rats as to segregate plague-stricken people; in fact, almost all the evidence regarding the causation of plague may be regarded as pointing to the rat as the chief agent in its diffusion. For this reason the importance of destroying rats has been insisted on by the framers of the Paris Convention of 1903, and although European opinion is not unanimous on the point, the Governor-General considers that experience recently acquired in India warrants the belief that the systematic destruction of these animals promises to be one of the most effective measures that can be adopted for preventing the spread of plague.

"Observation has also shown that plague is most severe where the houses of people are crowded together, badly built and imperfectly ventilated, while it usually spares those areas in towns where the streets are wide, houses well built, the alleys and side walks paved, and the drains properly constructed. It follows that municipalities and local bodies should be encouraged and assisted to demolish insanitary quarters, to improve the paving of alleys and side-walks, to neglect no opportunities of widening the narrow streets, to enforce simple building rules, and perfect their systems of drainage and conservancy. All go-downs where grain is stored should be rendered rat-proof, and should be liable to periodical inspection. In theory the disinfection of both houses and clothing takes a high place among preventive measures, and in cases of pneumonic plague it must be

regarded as imperative; but the great difficulty of carrying out the process thoroughly in a house casts some doubt upon its practical utility, and the Government of India leave it to local authorities to determine the extent to which it should be enforced with reference to prevalent structural conditions. In any case, the efficacy of house disinfection depends entirely upon the methods employed. The fluids used must be really germicidal, such as solutions of corrosive sublimate, cyllin, or izal. They must be intelligently applied under proper supervision, and care must be taken to prevent reinfection of the building by rats. These observations apply in their full force only to towns where the disease has not fully established itself. In villages the disinfection of houses is seldom of much use, while in towns, where plague has become indigenous, the difficulty of completely excluding rats leads to constant reinfection. Of the various measures hitherto adopted with the object of arresting an outbreak of plague none has proved so efficacious as the prompt abandonment of an infected locality for a period that varies with local conditions. In the case of villages, indeed, the evacuation of all houses, accompanied by the systematic destruction of rats, is probably the only means of effectually combating the disease. It is, however, essential that evacuation should be carried out thoroughly. If a portion of the inhabitants remains behind, the disease will continue to spread. In all cases where evacuation is feasible, the people should be encouraged to resort to it, assisted by the grant of blankets and warm clothing, where necessary, and by the provision of huts or materials for building them.

"The evidence which has been collected shows that the inspection of travellers by railway, road and steamship is often successful in averting or delaying the spread of plague, but that the efficacy of this measure depends on the circumstances in which it is applied. It is of most value in protecting limited areas such as hill stations and places so situated that inspection posts command all routes of access. The mere inspection of persons arriving by steamer is, however, of little use unless the rats on board the vessel are destroyed or are prevented from reaching the shore. A segregation camp for the detention of sick is a necessary adjunct to every inspection station, but no one need be detained who is not actually suffering from plague. In all other cases it is sufficient to record travellers' names and addresses and to arrange for their being under surveillance for five days. Experience has shown that mere contact with a case of bubonic plague in a railway carriage involves little danger of infection. The example of prisons proves that quarantine may be relied upon to prevent the spread of plague by human beings, but it can seldom be applied effectually, except by the people themselves, who have sometimes combined to prevent persons from infected places from entering their villages, and have provided accommodation for them outside the inhabited site. In rural areas the adoption of these measures may properly be encouraged, but they do not admit of application to towns. The removal of the sick to hospital, while it is eminently desirable in their own interests, has always been unpopular, and in cases of bubonic plague the necessity for it may be avoided, provided that the surroundings of the patient can be kept clean and free from rats. That the measure is instrumental, however, in delaying the spread of the disease is undeniable, and even though segregation may be relaxed when indigenous cases become widespread, the first few cases imported into a plague-free town should, whenever possible, be segregated without delay. Cases of pneumonic plague, which is directly infectious from man to man, ought always to be segregated. The segregation of persons who have been in contact with a patient suffering from bubonic plague is often impossible in practice. When it can be carried out with the good-will of the people the measure is no doubt useful, but where coercion has to be employed more harm than good is likely to result. In cases of pneumonic plague, however, the segregation of contacts is necessary, as the risk of infection is extreme.

"Inoculation with the prophylactic fluid now manufactured at the Parel Laboratory is of value, not merely for the protection which it affords against plague, but also by reason of its effect in mitigating the violence of an attack. The extent to which it may be adopted depends upon the strength of popular sentiment in its favour or against it, and the Government hope that the people may be encouraged to have recourse to it.

"While the experience of the last five years establishes the utility of the measures enumerated above, it equally teaches that their application must depend upon the circumstances of locality, the character of the people, the stage which the disease has reached, and the agency available for dealing with it. What is necessary in a district free from plague may be useless or vexatious where plague has become indigenous. What is effectual in one part of the country may be inoperative in another. A degree of control which is acceptable to a particular community may be strongly resented by the people who observe a different code of social usage, and in a province with a well-developed system of village officials more can be attempted than in a province where no such organisation exists. Where conditions vary so widely from province to province, as is the case in India, it is manifestly impossible for the Governor-General to lay down a uniform scheme of plague administration. The Local Governments alone are competent to determine what measures are practicable or expedient at particular times and places, and it is upon them that the Government of India rely to make the best use of the opportunities which present themselves for checking the spread of the disease. Finally, the Governor-General would observe that in the last resort all preventive measures depend for their success upon the hearty co-operation of the people themselves, and that every effort should be made to enlist their sympathies and to bring home to them, through their natural leaders and in any other way that may be practicable, that it rests mainly with them to bring about by their own action the cessation of plague in India, as it has long ago disappeared from Europe. When this conviction has been firmly established in the minds of the people, the task of district officers throughout India will be materially lightened, but that can only be obtained by carrying out thoroughly whatever measures it may be decided to introduce, and by impressing upon all officers concerned in plague administration that when a decision has been arrived at there must be no hesitation in giving effect to a policy approved by the Local Government."

Translation.

PRELIMINARY STATEMENT ON THE RESULTS OF A VOYAGE OF INVESTIGATION TO EAST AFRICA.

By R. Koch.

(Translated from the German by P. Falcke.)

(Continued from page 45.)

(2) DEVELOPMENT OF PROTOPLASMA¹ (sic) BIGEMINUM.

The *Piroplasma bigeminum*, the active agent of Texas fever, is capable of undergoing a peculiar cycle of development in certain species of tick under particular climatic conditions.

In order to follow this development one should examine the contents of the stomachs of ticks removed from an infected beast which have gorged themselves with blood on several successive days.

The pear-shaped parasite, the chromatin of which has usually already divided into two distinct masses

¹ Sic in original. Obviously a misprint in the German article for *Piroplasma bigeminum*. (Smith and Kilborne.)

(fig. 3), leaves the red blood corpuscle and becomes elongated, one of the two chromatin bodies passing to the anterior extremity of the parasite and forming a sharp dark point. The other mass of chromatin remains in about the centre of the parasite, and has a less compact appearance (fig. 4). Ray-like processes appear on it near the point; at first two or three, later on more. At the inferior extremity of the parasite several rays or processes also often develop. The parasite has always an angular, radiating look (figs. 5 and 6). Often it resembles a mace pointed at one end, and exhibiting a granule of chromatin surrounded by stellate rays at the other extremity (figs. 7 and 8).

From the second day there are often found, in addition to the above described forms, others in which two specimens are connected by their posterior extremities, looking like one body with a central piece, and its two extremities furnished with star-like chromatin granules (fig. 9). I consider this form to be referable to some form of copulation. Besides these, globular formations appear, the interior wall of which is strewn at intervals with chromatin, and which in addition have a point of chromatin at the periphery (fig. 10). They convey the impression of having originated from copulating parasites which have cast off the ray-like processes.

The parasites provided with rays have a great tendency to unite into groups of from three to ten or more specimens, amongst which copulating couples may often be found. Moreover, one occasionally comes across loughish, oval or pear-shaped bodies, which, when the plasma is stained blue, exhibit a moderately large nucleus of chromatin of granular consistency (fig. 11). These forms appear to me to be a transition to the comparatively large forms, which are likewise pear-shaped, and which I have frequently encountered in the ova of infected ticks (figs. 12 and 13). They are three or four times the size of the piroplasma in the blood of oxen, and it may therefore be assumed that other transition forms must exist. These should be sought for in young ticks. They may, perhaps, be found in the embryos, or immediately after the young are hatched, as it is known that the young tick is capable of conveying infection.

Hitherto I have not succeeded in discovering this transition form.

I was able to demonstrate the conditions of development of *Piroplasma bigeminum* in *Rhipicephalus Australis*, *R. Evertsi*, and in *Hyalomma Aegyptium*, but only in fully developed and gorged ticks and their ova. I never found them in the larvæ, nymphæ or ungorged adult specimens, though I frequently examined them.

(3) THE COAST FEVER OF OXEN.

The parasites of Coast fever differ in so many essentials from the well-known piroplasma of the ox, dog, and horse that they are probably not specifically identical.

They do not exhibit the regular division into two, so characteristic of piroplasma. On the contrary, in Coast fever the parasites are always found to regularly

divide into four, arranged in the form of a cross (·:·). This never occurs in the real piroplasma, but has been recorded in the disease discovered by Dschunkowski in Trans-Caucasian Russia, and which he has called tropical piroplasmosis.¹ In horses also there is a disease with parasites in the form of a cross² in addition to true piroplasmosis. It is therefore advisable to class those diseases in which cruciform parasites occur in one group.

Another peculiarity of Coast fever is that globular bodies in large numbers are found in the spleen and lymphatic glands; they consist of protoplasm staining blue, and contain a number of chromatin bodies. (The meaning of these forms is not sufficiently clear, and I defer their description till the appearance of my complete work.) Even before the parasites have appeared in the blood these forms are so regularly found in the spleen and glands that I was able advantageously to diagnose the disease in slaughtered animals by their presence.

I also succeeded in discovering the first stages of development of the parasite of Coast fever which are undergone in the tick. In this they are analogous to the *Piroplasma bigeminum*, as they, too, assume angular forms provided with rays; only they are considerably smaller and have fewer corners and rays (fig. 14). It is thus proved that the parasites of Coast fever, notwithstanding the differences alluded to, correspond, as to their developmental history, with the closely related true piroplasma.

It must be mentioned, in addition, that the development of this parasite had hitherto only been observed in adult and engorged specimens of *R. Australis*. This would seem to point to the inference that in Coast fever the infection only takes place by means of the young ticks of this or other species, in which it may be hoped that the further development of the parasites may, ere long, be worked out.

(To be continued.)

Miscellaneous.

THE ESPERANTISTS AND THE BRITISH MEDICAL JOURNAL.

THE *British Medical Journal* has embroiled itself with the Esperantists, who have taken deeply to heart the Editor's description of their philological plaything as a "pigeon jargon." No class of medical man has better reason for desiring a means of international communication than the student of tropical medicine; but he is as little likely to waste his time on an unscientific attempt to facilitate it as his stay-at-home colleagues, for the very good reasons pointed out by the *B.M.J.*, that languages are evolved and cannot be made.

What the Esperantists appear to overlook is that

¹ By the demonstration of this cross-form I was enabled to confirm the distribution of cattle disease, which is very similar to Coast fever in the countries on the Mediterranean, in East Africa, and New Guinea.

² Dr. Kudicke demonstrated the same parasites in the zebra.

there is no need whatever of trying to enhance the curse of Babel by inventing a new tongue, as the acquirement of 2,000 words of any language will enable one to understand and be understood for all ordinary purposes, and hence all that is required is for the nations to decide on the medium of inter-communication.

There is a good deal to be said for the Journal's recommendation of Latin, but this can hardly be carried out in England until we have improved our public schoolmasters and university dons off the face of creation; for their system of teaching Latin by commencing with verse, and ending with a vocabulary of the least useful words and idioms will never give a vernacular knowledge such as is required for the work-a-day purposes of conversation. Added to this, their pronunciation is so barbarous as to be absolutely unintelligible to any foreigner. It may be admitted, too, that the richness and flexibility of the language, and the fact that our terminology is mostly Latin, of a sort, makes its use as a scientific *Lingua Franca* quite practicable, but it is still probable that the Journal underrates the difficulty of adapting it to such purposes. Dead Latin, that is to say, the Latin of Cicero, was evolved to meet the necessities of 100 B.C., and had already been found quite unsuitable to the necessities of the fourth century, A.D., as evidenced by the moans of the "schoolmen" on what they are pleased to call the decadence of the tongue at that period. This, however, is an unscientific view of the case, for the language had not decayed, but evolved; and it is doubtful if any stage of a language that is not in the use of a civilised populace of the present day is really suitable to our needs.

Nothing but international jealousies prevent the most desirable consummation of some one modern language being chosen for the purpose; and however pitiable the reason may be, English, French and German are at once out of court for the very reason that they are the tongues of "great powers." Why, then, should not modern Latin, or, in other words Italian, be chosen?

Ninety-nine per cent. of classical scholars of all nations would acquire a sufficient knowledge of this easy and beautiful language in a tithe of the time that would be required to enable him to adapt his knowledge of dead Latin to colloquial purposes.

So much of the best that has been contributed to tropical medicine has been written in Italian, that a working knowledge of that language is indispensable to all who desire to follow the literature of the subject; but there is no branch of science in which it is not rich, and it is needless to say that its non-scientific literature is second to that of no other nation. Latin is neither dead nor sleeping, but a living reality in its modern form, and in this way what we have learned of it would become of real use to us. Let us hope the question will be considered soon, as Italy is so rapidly advancing to the rank of a great power, that before long the claims its language to serve as an international tongue will have to be ruled "out of the running," and this would be unfortunate for all who have been at the pains to acquire a smattering of what should preferably be spoken of not as dead Latin but as Ancient Italian.

Personal Notes.

INDIAN MEDICAL SERVICE.

Captains to be Majors.—Cecil Robert Stevens, M.D., F.R.C.S., Leonard Rogers, M.D., F.R.C.S., Gordon Travers Birdwood, M.D., Cecil Charles Stewart Barry, Ernest Alan Robert Newman, M.D., Jay Gould, M.B., Reginald George Turner, James Davidson, M.D., and John Mulvany.

Lieutenant-Colonel W. A. Manson, I.M.S. is confirmed in medical charge of the 11th Lancers.

The services of Captains Hutchinson, Lindesay and Saigol, I.M.S., are placed at the disposal of the Bombay, Bengal, and Burma Governments respectively, the last named for plague duty.

Lieutenant-Colonel W. G. H. Henderson, I.M.S., reverts to military employ.

Captains W. A. Justice and W. Illius, I.M.S., are posted to Madras.

Major C. H. L. Meyer, I.M.S., on relief, to act as Professor of Medicine and Clinical Medicine and Therapeutics, Grant Medical College, *vice* Major L. F. Childe, M.B., I.M.S., proceeding on leave. Captain E. F. G. Tucker, I.M.S., on relief, to act as Professor of Pathology and Morbid Anatomy, and Curator of the Pathological Museum, Grant Medical College. Major C. H. L. Meyer, I.M.S., on relief, to act as First Physician, Jamshedji, Jijibhai Hospital, *vice* Major L. F. Childe, M.B., I.M.S., proceeding on leave. Captain H. Bennett, M.B., C.M., B.Sc., F.R.C.S., I.M.S., on relief, to act as Civil Surgeon, Surat. Captain F. H. G. Hutchinson, M.B., I.M.S., to be Resident Surgeon, St. George's Hospital, Bombay, *vice* Captain C. H. S. Lincoln, I.M.S., continuing to do duty as Deputy Sanitary Commissioner, Southern Registration District. Captain R. M. Carter, I.M.S., has been appointed to act as Civil Surgeon, Jacobabad, from November 1st, in addition to his own duties.

Lieutenant A. F. Hayden, M.B., B.S.Lond., L.R.C.P., M.R.C.S., has taken the Montefiore Bronze Medal and Prize in Military Surgery, and also the Martin Gold Medal in Military Medicine.

Military Assistant Surgeon N. S. Harvey, whose services have been placed at the disposal of this Government, to be Assistant to the Civil Surgeon, Naini Tal, with effect from December 8th, 1905, *vice* Military Assistant Surgeon C. G. Thompson, appointed Civil Surgeon, Garhwal.

India Office: Arrivals Reported in London.—Major J. S. Lumsden, I.M.S. Lieutenant R. F. Steel, I.M.S. Nursing Sister Miss W. M. Aldridge, C.A.M.N.S.I. Lieutenant-Colonel J. Brochi Mills, I.C.V.D. Lieutenant-Colonel J. W. Rodgers, I.M.S. Captain J. W. F. Rait, I.M.S.

Extensions of Leave.—Captain L. Rundall, I.M.S., 6 m., Med. Cert. Lieutenant J. W. H. Babington, I.M.S., 3 m., Med. Cert. Major H. A. Smith, I.M.S., 6 m., Med. Cert. Lieutenant-Colonel L. A. Waddell, C.B., C.I.E., I.M.S., 6 m., Med. Cert. Major F. Raymond, I.C.V.D., 1 m., Furlough.

Permitted to Return to Duty.—Lieutenant-Colonel T. R. Mulroney, I.M.S. Captain R. Bryson, I.M.S. Captain V. St. S. Mores, I.M.S. Major F. Joslen, I.C.V.D.

COLONIAL MEDICAL SERVICE.

BRIDGER.—J. F. E. Bridger, M.B. Lond., L.R.C.P., M.R.C.S., D.P.H., Medical Officer of Health, Bridgetown, Barbados.

CLOUGH.—Dr. J. A. Clough, Medical Officer, Lagos, takes over the duties of Resident Medical Officer of the Lagos Hospital.

FRENAIS.—Dr. A. C. L. La Frenais, L.R.C.P. Edin., has been appointed a Government Medical Officer of British Guiana.

TAYLOR.—W. I. Taylor, M.D., has left Lagos on leave.

WISE.—K. S. Wise, M.R.C.S., L.R.C.P., has proceeded to British Guiana in the capacity of Government Bacteriologist, a new appointment connected with the Public Hospital, Georgetown. Mr. Wise has resigned his appointment of Demonstrator at the London School of Tropical Medicine which he had held for several sessions.

DOMESTIC.

BIRTHS.

JENNEY.—At Quetta, on January 24th, 1906, the wife of Major Jenney, I.M.S., of a son.

MADDOX.—At Ranchi, on January 24th, 1906, the wife of Major Ralph Henry Maddox, Indian Medical Service, of a daughter.

McKECHINE.—At Jullundur, on January 25th, 1906, the wife of Captain W. E. McKechine, I.M.S., of a daughter.

MARRIAGES.

MACLAGAN—MARONY.—At the Cathedral, Lahore, on January 27th, 1906, by the Rev. W. B. Handford, Edward Douglas MacLagan, I.C.S., to Edith Marony, niece of Colonel T. E. L. Bate, I.M.S.

WHELAN—LONGHURST.—At Peshawar, on January 23rd, 1906, by the Rev. J. A. Cunningham, Captain J. F. Whelan, Royal Army Medical Corps, to Geraldine Arden, eldest daughter of the Rev. W. H. R. Longhurst, Vicar of Queenhill, Upton-on-Severn, Worcestershire.

LIST OF INDIAN MEDICAL OFFICERS ON FURLOUGH.

(Under Civil Rules.)

Showing the Name, Province, and Department, and the Period from which the Leave was granted.

Anderson, Captain S., I.M.S., B. Med., to September 25th, 1906.
 Anderson, Lieutenant-Colonel A. V., I.M.S., Bo. Med., 20 m. 8 d., September 10th, 1904.
 Bennett, Captain V. B., I.M.S., Bo. Med., to June 22nd, 1906.
 Browne, Colonel S. H., I.M.S., M.B. C.I.E., B. Med., 7 m. 15 d., September 18th, 1905.
 Calvert, Major J. T., I.M.S., B. Med., 21 m., June 6th, 1905.
 Clarkson, Major F. C., I.M.S., B. Comm., 17 m., June 16th, 1905.
 Close, Major J. K., I.S., U.P. Med., 10 m. 2 d., November 29th, 1905.
 Delany, Capt. T. H., I.M.S., B. Med., 17 m. 9 d., April 9th, 1905.
 Donovan, Major C., I.M.S., M. Med., 12 m., March 8th, 1906.
 Drake-Brockman, Major H. E., I.M.S., B. Med., 12 m., May 5th, 1905.

Drury, Major F. J., I.M.S., B. Med., 9 m., July 4th, 1905.
 Duer, Major C., I.M.S., B. Med., 18 m., May 12th, 1905.

Fayrer, Captain F. D. S., I.M.S., M. Med., 15 m., March 3rd, 1906.

Fullerton, Major T. W. A., I.M.S., U. P. Med., 12 m., February 18th, 1906.

Haffkine, W. M., C.I.E., Bo. Misc., 21 m., July 30th, 1904.

Henderson, Major S. H., I.M.S., U. P. Gaols, 9 m. 14 d., January 18th, 1906.

Hugo, Captain H., I.M.S., D.S.O., B. Med., 9 m., March 6th, 1906.

Irvine, Major T. W., I.M.S., 13½ m., September 29th, 1905.

Kemp, Captain D. C., I.M.S., M. Med., 4 m. 7 d., September 20th, 1905.

Lumsden, Major J. S. S., M.B., F.R.C.S., I.M.S., U.P. Med.

Lumsden, Major P. J., I.M.S., B. Med., 14 m. 18 d., September 10th, 1905.

Maitland, Lieutenant-Colonel I., I.M.S., M. Med., 12 m., March 30th, 1905.

Melville, Major H. B., U.P. Med., 20 m., March 1st, 1906.

Miller, Captain A., I.M.S., M. Med., 15 m., September 11th, 1905.

Morwood, Major J., I.M.S., U.P. Med., 20 m. 7 d., April 7th, 1905.

Mullroney, Lieutenant-Colonel T. R., P. Med., 23 m. 10 d., April 5th, 1904.

Niblock, Captain W. J., I.M.S., M. Med., 12 m., March 1st, 1906.

Orr, Major W. H., I.M.S., U.P. Med., 15 m. 4 d., December 3rd, 1905.

Perry, Captain E. L., I.M.S., P. Med., 9 m., August 15th, 1905.

Prain, Lieutenant-Colonel D., I.M.S., Botanical Department, 19 m., February 1st, 1905.

Rainier, Captain N. R. J., I.M.S., C.P. Med., 7 m. 23 d., November 19th, 1905.

Rait, Captain T. W. F., I.M.S., B. Med., 19 m., March 21st, 1906.

Rogers, Major F. A., I.M.S., B. Med., 23 m. 2 d., January 14th, 1904.

Rundle, Lieutenant-Colonel C. S., I.M.S., Burma Med., 21 m. 7 d., July 28th, 1905.

Scotland, Major D. W., I.M.S., U.P. Med., 21 m., June 26th, 1905.

Shore, Lieutenant-Colonel R., M.D., I.M.S., B. Med., 15 m., February 1st, 1906.

Smith, Captain F. A., I.M.S., B. Med., 15 m., February 15th, 1906.

Smith, Major H. A., I.M.S., U.P. Med., 15 m. 4 d., July 23rd, 1905.

Stephenson, Captain J., I.M.S., P. Med., 18 m. 26 d., February 4th, 1905.

Stodart, Major J., I.M.S., Burma Med., 4 m., January 4th, 1906.

Street, Major A., I.M.S., Bo. Med., 9 m., January 15th, 1906.

Symons, Captain T. H., I.M.S., M. Med., 14 m. 22 d., August 21st, 1905.

Thomson, Lieut.-Colonel S. I., C.I.E., I.M.S., U.P. Comm., 11 m., May 1st, 1905.

Tucker, Captain W. H., I.M.S., M. Med., 10 m. 20 d., August 20th, 1905.

Vost, Major W., I.M.S., U.P. Med., 15 m., May 14th, 1905.

Wilkinson, Major E., I.M.S., P. Comm., 21 m., July 5th, 1905.

Wood, Major H. S., I.M.S., B. Med., 21 m., March 20th, 1905.

Young, Major W., I.M.S., U.P. Med., 21 m. 21 d., January 19th, 1906.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Bulletin de l'Institut Pasteur," T. iv.

BACILLARY DYSENTERY.

Médecin Major Ch. Dopter points out that dysentery is a symptom of several distinct diseases. There is, for example, a dysentery due to *spirilli*, another due to *Balan-tidium coli*, and a third to bilharziosis. But the two commonest are the amœboid dysentery of hot countries and the bacillary dysentery, which is found alike in the hot and temperate parts of the world. Though repeatedly noted, it was not till 1898 that Shiga succeeded in distinguishing the bacillus from the *B. typhosus* and *B. coli*. He further demonstrated its specific character by showing that the serum of patients agglutinated its cultures. The bacilli are short, with rounded ends, scarcely motile, not staining by Gram's method, not liquifying gelatin. The colonies, at first punctiform, grow and assume a foliated appearance, with a dark centre and clear periphery. Two years after Kruse found the same organism in cases seen in Westphalia. Since then Shiga's observations have been confirmed by a large number of workers in all parts of the world, and he has clearly demonstrated the specificity of the organism by producing the disease in rabbits, dogs and pigs, and by comparing his cultures and their behaviour with strains obtained from Shiga, Kruse and others. In announcing their investigations, the authorities quoted soon came to the conclusion that, in spite of morphological and cultural resemblances, there are really not one, but several, dysenteric bacilli which differed mainly in their agglutinating power. It was further shown that they differed also in their fermentative properties, the Shiga-Kruse bacillus failing to ferment mannite and maltose, while the Flexner-Manille organism does so. Leutz, however, regards the latter as not pathogenic, but only an associated organism. Park, Collins and Goodwin distinguish three sets of organisms:—

(1) Shiga's bacillus. Does not form indol. Ferments neither mannite, maltose, or saccharose. Inoculated animals yield a serum powerfully agglutinative for this, but only slightly for the other classes.

(2) Bacilli which form indol, ferment the above sugars, and in which the serum of inoculated animals agglutinates cultivations of this type and also those of the third sort.

(3) The Flexner-Manille type, which forms indol, ferments the above sugars, and in which the serum of inoculated animals agglutinates cultivations of this and the second class, and also the *coli* bacilli. Some authors, however, make a more minute classification, but there appears to be a general tendency to regard the Shiga-Kruse bacillus as alone specific, and the Flexner as associated with them. The author then enumerates and describes in detail the organisms that have been described up to date, the general conclusion hitherto arrived at being that cases may be divided into two classes: First, true bacillary dysentery, caused by the Shiga bacillus; and secondly, a variety of pseudo-dysentery caused by a variety of pseudo-dysenteric bacilli. He then describes in detail his own observations on these organisms, and discusses the clinical and epidemiological evidence, and concludes that in spite of the arguments brought forward by his predecessors, there is no sufficient reason for subdividing bacillary dysentery.

He admits that in a general way dysenteric bacilli can be arranged in two groups, but it is inexact to assert that the Flexner bacillus can be further subdivided. He, however, regards all forms as really identical, and all equally specific, and on this account considers that such terms as "true dysentery," infantile dysentery, &c., should be abandoned in favour of the one term, bacillary dysentery.

"Journ. of Hyg.," T. jafic. 4, 1905.

SARCOSPORIDIAN FOUND IN THE MUSCLES OF A MONKEY.

Korte, W. E.—These organisms were found in a *Macacus rhesus*, and are the first ever found in any monkey. The parasites are sausage-shaped, surrounded by a capsule which shows a fine striation perpendicular to its surface and filled with spores.

"C. R. Soc. Biol.," T. lix., 1905.

INTESTINAL COCCIDIOSIS OF THE OX IN TUNIS.

Dueloux, E.—He describes a serious malady principally affecting young oxen, and often fatal, characterised by severe diarrhoea, at first liquid and then sero-sanquinolent. The lesions are found in the abomasum and intestine. The epithelial cells of Lieberkühn's glands of the large intestine are found to contain coccidia, which are tetrasporocystic and digonic. Similar cases appear to have been recognised in France and Switzerland.

"Munch. Med. Woch.," T. lii.

PENETRATION OF THE SKIN BY LARVAL ANKYLOSTOMES.

Bruns, H., and Müller, W., obtained positive results in the case of ten dogs on which the larvæ were either placed on the skin or injected beneath it.

Their first two attempts to infect the human subject by placing the larvæ on the skin of the forearm failed, but two others, in which the skin was soaked in warm water for half an hour, succeeded. In the first case eosinophilosis appeared after three weeks and eggs in the stools on the 53rd day; in the second case after 20 and 46 days respectively. The authors consider, however, that infection by the mouth is the commoner and more certain method.

"Lancet," February 17, 1906.

MALTA FEVER IN INDIA.

Captain W. H. C. Forster, who is Deputy Sanitary Commissioner in the Punjab, recalls the fact that Wright, at Netley, demonstrated the specific reaction of Malta fever in patients invalided from India, and these observations were confirmed by Lamb and Birt in India. Doubts were, however, thrown on the accuracy of these observations, and "at the beginning of the present year it was officially held that Malta fever had not been proved to exist as an endemic disease in India." Lamb and Pais have, however, recently removed all doubt on the subject by isolating the *Micrococcus melitensis* from the spleens of Indian cases. These writers *inter alia* described cases occurring among the 14th Sikhs at Ferozapur, and in view of the work of Dr. Zammit and Major W. Horrocks on goats in Malta, Captain Forster decided to repeat their observations on the goats supplying milk to the 14th Sikhs. The result was that 4 out of 38 goats examined gave a positive reaction, and that two of these, which were taken for further observation to the Pasteur Institute, Kasauli, were found to yield milk infected with the specific organism of Malta fever. Any doubts as to the occurrence of the disease in India may therefore be considered to be set at rest.

Notes and News.

PROFESSOR KOCH starts for East Africa early in April.

The chlorine-free culture medium for the *Bacillus lepræ*, by the use of which Captain Rost, I.M.S., in Rangoon, claimed to have succeeded in cultivating the pathogenic organism of leprosy, has been tested by Dr. Frank Tidswell in the laboratory of the Loper Asylum of the Government of New South Wales, but

without success. The stringy, heavy deposits, described by Rost did not appear, and though there were a few of what appeared to be leprosy bacilli in the first culture, none appeared in the second.

It will be noted that this confirms the negative results obtained in a test last year, instituted at the Pasteur Institute, Kasauli. We hope, however, that Captain Rost will not be discouraged from continuing his experiments, which were conducted in a truly scientific spirit, as the practical therapeutic results of the treatment he based on them were, according to independent medical testimony, undoubtedly remarkable, whatever may have been the merits of the theory on which they were based.

ENTERIC IN INDIA.

The (Indian) *Pioneer* devotes a leading article to the closing of the controversy between Sir Thomas Gallway, P.M.O., in India, and Dr. Leigh Canney, in the columns of the *Times*, as to the etiology of typhoid fever. Dr. Canney advocates the theory that water carriage is practically the only vehicle of infection that need be taken into practical consideration; while Sir Thomas represents what is undoubtedly the opinion of the vast majority of medical observers who have had to deal with typhoid in India and in many other tropical countries. No one, of course, denies the importance of drinking water as a potential vehicle, but it is an undoubted fact that though cantonment water supplies in India have now almost universally been raised above suspicion, their steady improvement has not been followed by any proportionate diminution in typhoid. Water is only one, in fact, of a number of possible vehicles, and in India flies and dust are probably more often implicated than drinking water, and it is in guarding against these sources of infection that further improvement may be looked for.

PLAGUE AND SMALL-POX IN RANGOON.

During the last month there were 128 cases of plague, with 126 deaths.

The number of cases of plague for the year ending the 4th ult. in Rangoon, where the epidemic began on February 4th, 1905, is 2,969, with 2,672 deaths. There were in January 425 cases of small-pox in Rangoon, being the largest number yet known.

The Indian plague returns for the week ending January 27th show 3,747 deaths, compared with 4,240 in the week preceding. The principal figures are: United Provinces, 958; Bengal, 896; Bombay Presidency, 707; Punjab, 381; Central Provinces, 484; Burma, 136.

The immunity of Europeans continues to be one of the most noticeable features of the plague epidemic. Last year in the Bombay Presidency, where the disease carried off over a quarter of a million people, only nineteen Europeans in all were attacked, of whom ten died. In the previous year, in the same region, where 316,000 deaths took place, only eight were amongst Europeans.—*Pioneer Mail*, February 9th, 1906.

PURE WATER FOR TRAVELLERS.

In the Tropics and Sub-Tropics where water-borne diseases are so prevalent, and wherever water is suspected of being impure, any apparatus that really purifies water, rendering it sterile and yet leaving it pleasant to the palate and good for the health, must needs be of the highest value and importance. Even the best of filters have their limitations, the objections to them are well known. The "Gem" Pure Water Still, of which an illustration is given, removes all impurities—germs and mineral matter—by the effective process of distillation. The still is in three parts: In the lowest the water is boiled and vapourised, the vapour rises, and striking on the top part, which is filled with cold water, is condensed and trickles into the middle section, whence it is drawn off into a bottle. The still has been approved by high medical authority, and its value has been proved by travellers in Persia, Africa, China, and elsewhere. It is made entirely of metal, there is no rubber or mechanism to get out of order; it is simple, light, portable, effective, and



in every way satisfactory. The "Gem" Supplies Co., Ltd., of 121, Newgate Street, London, will send particulars of the still to any of our readers who may enquire. Of course, this still is as useful to residents as to travellers. Indeed, a great many "Gem" stills are constantly in use even in Great Britain, in many parts of which the quality of the ordinary water leaves much to be desired.

PLAGUE.

PREVALENCE OF THE DISEASE.

	Cases.	Deaths.
India.—Week ended Jan. 6th ...	5,184	4,278
" " 13th ...	5,029	4,240
" " 20th ...	4,652	3,938
" " 27th ...	4,478	3,747
" Feb. 3rd ...	6,116	5,042
Hong Kong.—Week ended Feb. 3rd	2	2
" " 10th	6	6
" " 17th	5	4
" " 24th	12	12
Mauritius.—Week ended Feb. 16th	1	1
" " 23rd	0	0
South Africa.—No cases of plague.		

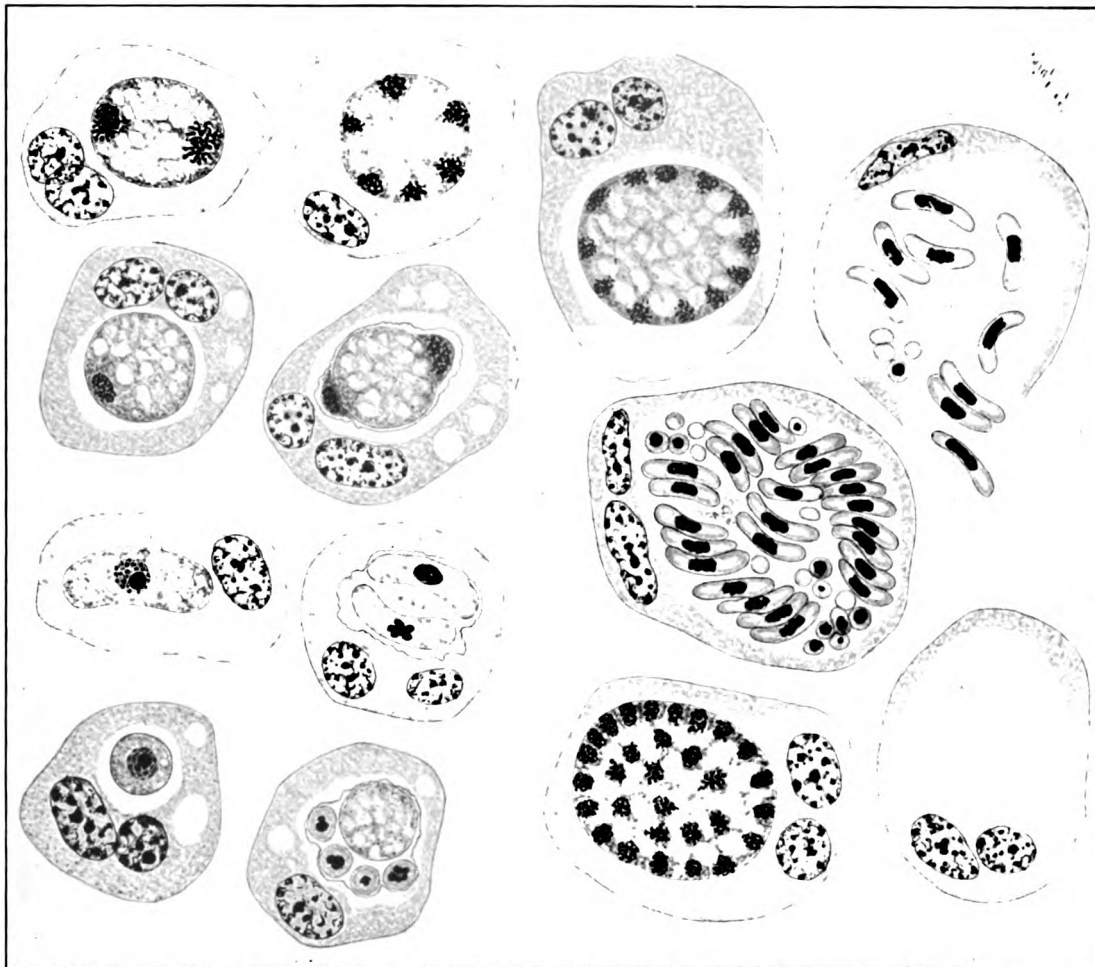
Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to *JOURNAL OF TROPICAL MEDICINE* should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

PLATE I.



PLATE II.



To illustrate Dr. ANDREW BALFOUR's article, "A Haemogregarine of Mammals and Some Notes on Trypanosomiasis in the Anglo-Egyptian Sudan."

PLATE III.

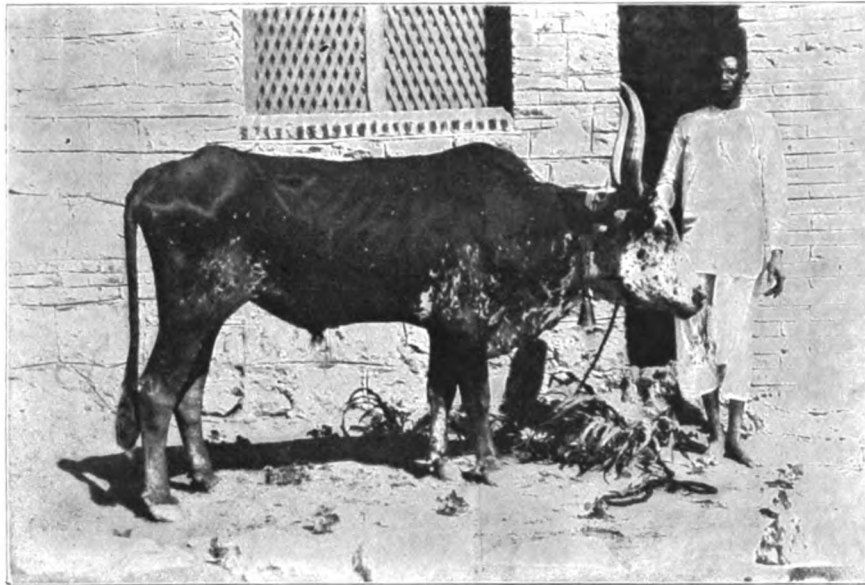


FIG. 1.

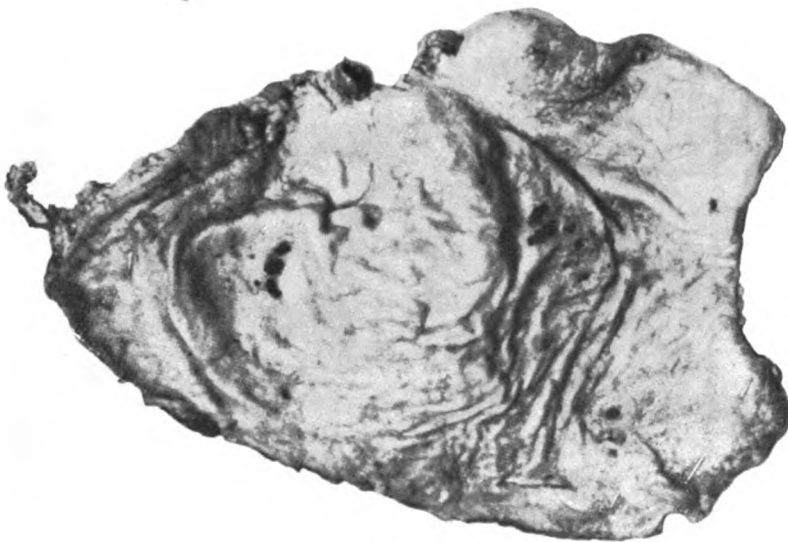


FIG. 2.

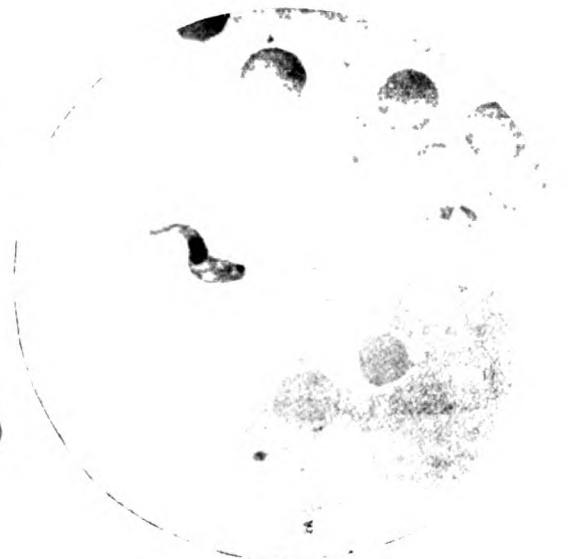


FIG. 3.

To illustrate Dr. ANDREW BALFOUR's article, "A Hæmogregarine of Mammals and Some Notes on Trypanosomiasis in the Anglo-Egyptian Sudan."

Original Communication.

A HÆMOGREGARINE OF MAMMALS AND
SOME NOTES ON TRYPANOSOMIASIS IN
THE ANGLO-EGYPTIAN SUDAN.By ANDREW BALFOUR, M.D., B.Sc., M.R.C.P.(Edin.),
D.P.H.(Camb.).Director, Wellcome Research Laboratories, Gordon College,
Khartoum.

A HÆMOGREGARINE OF MAMMALS.

H. jaculi—*H. balfouri* (Laveran).Being one of the Craggs Prize Essays recently awarded by the
London School of Tropical Medicine.[The first part of this paper was published in the Journal of
August 15th, 1905.]

WHILE carrying out work in connection with trypanosomiasis, I have had occasion to make numerous examinations of the blood of the jerboa, or desert rat (*Jaculus jaculus*, or *J. gordonii*, as I believe it has been renamed) (fig. 1).¹

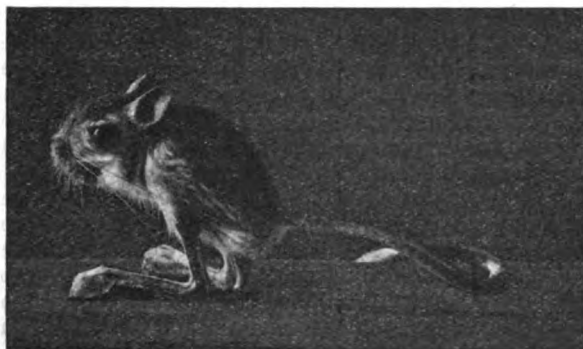


FIG. 1.

In the first blood examined I was surprised to see that a large proportion of the red blood corpuscles harboured an unpigmented and non-motile parasite. In the stained specimen it was at once apparent that we were dealing with some kind of trophozoite. Twenty-nine jerboas have up to the present been examined, and in all of them, with the exception of two very young animals, this parasite has been found. Specimens were sent to Professor Laveran, who at once declared the parasite to be a hæmogregarine, and has kindly informed me that the discovery is one of much interest. He has further urged me to publish some notes upon its life-history, although my observations are yet far from complete.

The Appearance of the Parasite.—The trophozoite in the fresh blood appears as a pale, hyaline, homogeneous body, slightly curved and with rounded ends (sausage-shaped), lying either apparently free or in the remains of a red blood corpuscle. The latter may be represented only by a bow uniting the two poles of the parasite, just as it is sometimes seen in the case of malarial crescents. The free forms, I believe, owe their condition to a total destruction or absorption of

the substance of the erythrocytes which once contained them. As stated, the parasite is non-pigmented and non-motile, and I have found it to be rather resistant, remaining to all appearance unchanged in sterile citrated blood for a period of seventy-two hours, both when kept at room temperature (about 36° C.) and at 22° C. It is to be noted, however, that it altered somewhat in its staining reactions. As a rule, it measures from 5.6 to 7 μ in length, and from 1.4 to 2.8 μ in breadth. The number present has been found to vary considerably. There may be six or seven, or even more, present in each microscopic field (Leitz oc. 4, oil imm. $\frac{1}{15}$), or only a few may be found in the whole blood smear.

Staining the Parasite.—On staining by the Leishman-Romanowsky method, in exactly the same way as for malaria protozoa, the structure of the parasite becomes at once apparent, and the shape, as described above, well defined. A large oval nucleus, constituting, as a rule, about one-third of the organism, is seen to be present, situated generally in the centre of the parasite and stretching right across it, so that there is a deep blue-staining area (the nucleus) in the middle, and a faintly staining blue area with a rounded end on either side. Occasionally, but rarely, and then usually under special conditions, spherical chromatin dots may be found in one or other of these pale polar areas. In stained preparations it is common to find that no vestige of the red blood corpuscle which originally harboured the parasite remains (Plate I., c), but careful search will nearly always reveal one or two parasites with portions of the red-staining erythrocyte adhering to them. All that may be present is a thin, red, curved line stretching from pole to pole across the slight concavity of the parasite (Plate I., a). Sometimes, especially if the blood be citrated, the relation of the parasite to the blood cell which contains it is beautifully shown. A process of absorption of the cytoplasm of the red cell evidently goes on, and in a severe infection there must be a considerable destruction of erythrocytes. The animal host, however, does not seem to suffer in health. I have kept a jerboa with a considerable infection for three months in the laboratory, and it remained well and lively throughout the whole period. Two others died in captivity, exhibiting violent *ante-mortem* convulsions, and it is worth noting that these rodents do not stand handling well, and must not be supplied with water.

In the peripheral blood it is customary to find all the parasites at or about the same stage of development. True, they differ somewhat in aspect. Thus it is not uncommon to find the nucleus situated at one pole, so that half the parasite stains a deep blue and the other half a very faint blue. Again, one end of the parasite may be pointed, so that the body is club-shaped. This is probably due to alteration during the preparation of the blood smears. In the heart's blood of a jerboa which died naturally I found two distinct forms, a large swollen variety (11.2 μ by 4.2 μ), in which the greatest increase had taken place in the light-staining part of the protoplasm, and a form like those already described (Plate I., d). It was very noticeable that the nuclei of the former, often of a triangular shape, stained a deep Romanowsky purple, and frequently did not stretch wholly across the para-

¹ We are informed that *Jaculus Gordonii* has been distinguished from *J. jaculus* on account of differences of coloration, though it is quite possibly merely a local race of the latter.—Ed. J. T. M.

site, and in the large pale-staining area three or four spherical chromatin dots were often to be observed.

Professor Laveran has seen this preparation, and points out that such peculiarities in morphology frequently occur. He does not regard these as special sexual forms. At first I was inclined to consider the parasite as being allied to the halteridium of birds. I noted, however, that it was not pigmented, was not curved so much as the halteridium forms, and never exhibited the spore formation at either end as does *Halteridium danilewskyi*.

Endoglobular Hæmogregarine of this Class not Found Previously in the Red Corpuscles of Mammals.—As Professor Laveran kindly pointed out to me, and as, indeed, was soon apparent from a study of the literature, especially Professor Minchin's treatise on the sporozoa, this parasite of jerboa closely resembles the *Hæmogregarinida* of cold-blooded vertebrates. This fact is of extreme interest, as I am unaware of any endoglobular parasite of this class having been described in the blood of mammals. Bentley (1) has recently produced a paper on a leucocytozoon of the dog in Assam, but I understand there is some doubt as to his parasite, also described by James (2), which, moreover, affects the leucocytes. The classification of this order of parasites given by Professor Minchin is as follows:—

“Order *Hæmosporidia* (Danilewsky).

“Sub-order I. *Hæmosporea*.

“Genus i. *Lankesterella* (Labbé, 1899) for *Drepanidium* (Lankester). The hæmogregarine is not more than three-quarters the length of the blood corpuscle it inhabits.

“Genus ii. *Karyolysus* (Labbé, 1894). The hæmogregarine does not exceed the corpuscle in length.

“Genus iii. *Hæmogregarine* (Danilewsky, 1897), (syn. Danilewsky-Labbé, 1895).

“The body of the parasite when adult exceeds the corpuscle in length, and is bent on itself within it in a characteristic manner like the letter V.”

Now the parasite of the jerboa in question does slightly exceed the corpuscle in length, but is only slightly curved. It looks as a rule as if it had outgrown its corpuscle, and sometimes the remains of what has evidently been a distended and distorted corpuscle can be seen lying around it. The large, swollen, and bloated forms are much larger than the corpuscles which originally contained them, and are found lying free. On several occasions, and especially in fresh preparations from the bone-marrow, I have noted forms slightly turned up at one end and looking like an incomplete letter V. I have not been able to demonstrate this appearance in stained specimens.

Laveran's classification, in which the genus *Hæmogregarine* is made to include *Drepanidium* and *Karyolysus*, is more simple, but whichever be adopted, it would seem that this parasite is undoubtedly a hæmogregarine, and I propose to give it the provisional name of *H. jaculi*,¹ though it is quite possible it may be found in other mammals. Indeed, I have recently discovered what seems to be the same parasite in the mononuclear leucocyte of the Norway rat (*Mus decumanus*) in Khartoum (Plate I., f.). It is probable

that it exists as a leucocytozoon in the rodents, but further observations are required. I have once found free forms in smears from the splenic pulp of a Norway rat.

Reverting to the parasite of the jerboa, a study of its life-history has further indicated its relation to the *Hæmogregarinida*, for I have succeeded in finding two further stages, i.e.:—

(1) The free, motile vermicle form.

(2) The stage of schizonts in the form of cytocyts.

In one instance only have I found the free trophozoite. I discovered two such forms in the peripheral blood of a jerboa, which showed the endoglobular trophozoite in fair numbers and which had some injections of the serum of a water-buck in connection with the trypanosome work.

A Free Motile Form of the Parasite.—This free form is in length about three times the diameter of a red blood corpuscle, is pointed at both ends, and moves very slowly through the blood, progressing by a series of contractions of its cytoplasm, the so-called “euglenoid” movements. As a result constrictions appear in the body of the parasite, as many as three having been seen present at one time. These, so to speak, run along the body of the parasite, which thereafter assumes its usual cylindrical shape and glides steadily across the field, always proceeding in one direction and with the same end in front. It pauses for greater or longer periods, undergoing various alterations in shape.

If it encounters a clump of red blood corpuscles it disappears among them, producing only a slight agitation amongst the erythrocytes, which it pushes out of its way. Granules are visible in the posterior part of the body. No flagellum has been seen nor anything to suggest the extrusion of a gelatinous thread, as occurs in the case of some of the gregarines. I have been fortunate enough to secure a stained preparation of this free trophozoite, the appearance of which further demonstrates its resemblance to a hæmogregarine (Plate I., b.).

Anteriorly there is a somewhat sharp-pointed area staining a light blue and in which close to the nucleus a chromatin dot is visible. Following this clear area comes a very lengthy, oblong, deeply stained nucleus. At one point it showed a constriction similar, no doubt, to those seen in the fresh preparation. It had been killed, fixed, and stained in the act of progression.

Behind the nucleus is a lengthy, light-staining area, terminating in a pointed extremity. This area stains a light blue with the Leishman stain and exhibits a cluster of chromatin dots, arranged in a somewhat rosette form immediately behind the nucleus. I noted a single central dot with six others arranged in a circle around it. A few similar dots, irregularly arranged, are also visible close to the posterior extremity.

Measurements:—

Total length	...	...	15.5 μ
Length of the nucleus	...	...	7 μ
Length of anterior light area	...	...	2.8 μ
Length of posterior light area	...	...	5.7 μ
Greatest breadth	...	...	2.8 μ

The nucleus, it may be said, stretches completely across the body, entirely separating the anterior from the posterior moiety. The broadest part of the

¹ Professor Laveran has recently written me to say that he has given the name of *H. balfouri* to this parasite.

parasite is towards the posterior end of the nucleus. In most cases a third stage can be readily demonstrated. This is chiefly seen in the liver and kidney, organs where the circulation is slow, and will probably be found also in the bone-marrow and brain. Indeed, some smears of the bone-marrow have shown what were probably empty cytocysts. In thick smears from the liver and kidney well-defined cysts are found, the walls of which are apparently formed by the remains of cells of these organs which have been destroyed by the parasitic growth (Plate II.).

These cysts vary much in size. The largest I have noted occurred in a liver smear and measured 39.6μ by 33.6μ . A common dimension appears to be about 22.4μ by 16.8μ , but many smaller cysts occur.

It is usual to find some of these cytocysts empty, or at the most containing a little residue protoplasm, but a certain proportion are found to contain merozoites (Plate II.), readily recognisable by their shape and nuclei, and somewhat resembling the trophozoite stage in the blood. The nuclei, however, are comparatively small, and in many cases the merozoite appears to be longer and more pointed at the ends than the endoglobular trophozoite.

Schizont Forms.—Early schizont forms also occur, in which the protoplasm contained within the cyst wall has not been differentiated and stains more or less uniformly. Sometimes darker-staining portions indicate the future nuclei of the merozoites. When complete division has taken place some residual protoplasm remains behind, and the whole condition is very like that which has been described by Labbé (3) in the case of *Karyolysus lacertarum*. Sections of the liver stained by the Giemsa method show all stages of the schizonts. Mitosis of the nuclei and the formation of daughter nuclei are well seen.

Appearances are very like those presented during the schizogony of some of the Coccidia, notably *Adelea ovata* are exhibited, and the whole condition from the invasion of the liver cell to the bursting of the cyst and the freeing of its contents can be traced. The merozoites in a ripe cyst can be seen to be arranged side by side nearly all round the periphery of the central undifferentiated mass of protoplasm which remains as the residuum.

By what channel the hepatic cell is invaded has not as yet been determined, but it is probably through the capillaries.

The interesting appearances presented by these liver sections, which were kindly prepared for me by Mr. Richard Muir, of the Pathological Department, University of Edinburgh, and required detailed study, are further confirmation, if any were required, that this parasite of jerboas is a hæmogregrine.

Laveran (4) has pointed out that the schizont stage of these parasites in reptiles is passed in the liver, and Labbé has given much attention to this subject. I have not yet been able to decide whether dimorphism occurs, and if micro- and macro-merozoites can be distinguished, but it is probable that such will be found to be the case.

Before seeing the liver sections I was under the impression that the non-sexual cycle was as follows: The trophozoite is set free from the erythrocyte as the travelling vermicle, which eventually penetrates a

cell of the liver or kidney, and gives rise to schizonts in the form of cytocysts. In these the merozoites are formed which, after certain changes, eventually escape into the blood stream, invade red blood corpuscles, and so restart the cycle of schizogony.

So far, however, one has not been able to see anything like the travelling vermicle in the liver sections. The form invading the hepatic cells looks like the trophozoite of the peripheral blood, or, at the most, one of the swollen forms already mentioned. Is it, then, possible that the travelling vermicle plays no part in this cycle? This is possibly so; or, again, as Labbé asserts, for *Lankasterella* and *Karyolysus* an isogamic conjugation may take place between two of these free forms, and it may be the zygote so formed which can be seen penetrating the liver cells. Many, however, disbelieve Labbé's conclusions, which have not been confirmed by the observations of Hintze (5) on *Lankasterella*, so possibly the free trophozoite directly invades the liver cell and becomes the schizont, while the free vermicle is intended to play a part in an extracorporeal sexual cycle. This leads us to consider the habits of the jerboa and the parasites which it harbours.

The rodent is a nocturnal animal, living in holes in the desert, remaining invisible throughout the day, but found hopping about in the evening and on moonlight nights. It exists far away from any water, which it does not seem to require, and its food probably consists of the minute seeds of the small plants which contrive to exist in sandy wastes. The animal is easily caught in traps baited with millet.

Both fleas and mites are found on the jerboa. The species of *Siphonoptera* present has not been determined, but I have dissected and examined the internal organs of engorged fleas taken from infected animals. My observations have been limited, but, so far, though I have found unaltered parasites in the blood from the stomach of a flea, nothing has been seen which suggests that a stage is passed in that insect. Further dissections are required. Some blood containing endoglobular trophozoites was placed in the acid citrate solution devised by Rogers (6) to stimulate the conditions present in an insect's stomach. Though kept in this medium for over forty-eight hours at room temperature, no change took place in the parasites, save that their cytoplasm became more granular.

I have not been able to examine the mites, which are extremely minute and not very often present. As the jerboa is nocturnal, I thought it well to chloroform one during the night, and at once examine its blood and organs. I failed to find the vermicle form or anything but the free and endoglobular trophozoites.

It should be said that to the naked eye there is no morbid appearance presented by any of the viscera. The spleen seems never to be enlarged, and, as far as can be told, the liver does not appear abnormal.

Further, it may be stated that numerous free forms (trophozoites or merozoites) are usually present in smears made from the liver, kidney and bone-marrow, and to a less extent in those from the spleen.

Professor Laveran writes me to say that he has now found the same parasite in jerboas from Tunis, so that no doubt much information will soon be forth-

coming regarding this interesting parasite of mammals. It will be of special interest to determine if it really exists as a leucocytozoon in *Mus decumanus*, or whether in the case cited the mononuclear leucocytes were merely taking on a phagocytic action, or whether the parasite found in the Norway rat is another distinct variety.

In concluding this paper, I would record my sincere thanks to Professor Laveran for his kind interest and advice; my indebtedness to Dr. Beam, chemist to the laboratories, for the photomicrographs; to Mr. Muir for the drawing of the vermicle; and to my laboratory assistant, Mr. Friedrichs, for his useful aid in the work.

REFERENCES.

- (1) *British Med. Journ.*, May 6th, 1905.
- (2) "Scientific Memoirs by Officers of the Sanitary and Medical Departments of the Government of India," New Series, No. 14.
- (3) *Arch. Zool. Exp. et Gén.* (3), ii., 1894.
- (4) *C. R. Soc. Biol.*, Paris (10), v. [1], 1893, and (11), i. [li.], 1899.
- (5) *Zool. Jahrb. Abth. f. Anat.*, xv., 4, 1902.
- (6) *Lancet*, June 3rd, 1905.

SOME NOTES ON TRYPANOSOMIASIS IN THE ANGLO-EGYPTIAN SUDAN.

In the *British Medical Journal* of November 26th, 1904, I published a preliminary note on the above subject. This article referred to the fact that I had found trypanosomes in the blood of a donkey from the Bahr-el-Ghazal, that Head (1) had discovered similar parasites in mules from the same region, and that in smears from the blood of Shilluk cattle which he had submitted to me for examination I had found these flagellates. Since that paper appeared a considerable amount of information has been obtained, and a good deal of research work has been carried out in the laboratories upon what is a very important subject in a country like the Sudan. The following are the chief points to which I wish to direct attention:—

- (1) The prevalence and distribution of trypanosomiasis in the Sudan.
- (2) The presence in cattle of a small trypanosome which Laveran has declared to be a new species, and which he has named *T. nanum*.
- (3) The question as to whether equines, or at least mules, are liable to a double infection by two different species of trypanosomes, or are the hosts of a *T. dimorphum* resembling that which affects horses in Senegambia.
- (4) The great frequency of hæmorrhagic ulcerative lesions of the stomach in trypanosomiasis and their significance, also the comparative frequency of intestinal ulceration.
- (5) The occasional presence of spirilla in these gastric lesions, both in the blood clot adherent to the ulcers and in the ulcerated surfaces.
- (6) The action of chrysoidin as a therapeutic agent in trypanosomiasis.
- (7) The therapeutic action in trypanosomiasis of the blood serum of wild animals (big game), whose habitat is in trypanosome-infected areas, a line of research suggested by Dr. Sheffield Neave (*vide infra*).

(1) *As regards Prevalence and Distribution.*—There can be little doubt that in the Southern Sudan, that

is to say, in the region south of the tenth parallel of latitude, trypanosomiasis exists to a very considerable extent. An illness known to be due to the bites of tsetse-flies, and affecting donkeys, horses, mules, and possibly camels, has been recognised in the Bahr-el-Ghazal province since that distant region was visited after the reconquering of the Sudan. Expeditions have experienced considerable losses in transport animals from this cause. Again, and more recently, sick and emaciated animals have been coming from the Upper Sobat district, and especially from the neighbourhood of Itang, a station on the Baro River, in Abyssinian territory.

Old records also speak of animals dying from fly-bite on the upper reaches of the Blue Nile, but accounts are so vague, both as regards the nature of the illness and that of the fly said to cause it, that no definite conclusion can be reached regarding the prevalence of trypanosomiasis in that region. No cases have been sent me from the Blue Nile provinces, and I have not received samples of tsetse-flies from these parts, nor seen them between Roseires and Wad Medani, where the river is more or less bordered by bush and forest. In the Northern Sudan, the region of sandy wastes, as pointed out in the preliminary note, trypanosomiasis has not been found to exist; but no great number of examinations have been made, and investigations upon frogs, lizards, and a large number of birds have yet to be conducted. Dr. Sheffield Neave, Travelling Pathologist to the Laboratories, has been working down Nile from Gondokoro, and has found trypanosomes in at least three species of Nile fish, in a lizard, in kites, and in vultures. These finds in birds are especially interesting in the light of Novy's and M'Neal's recent researches. (2)

For the purpose of gathering information and material regarding the trypanosomiasis of Shilluk cattle, I accompanied Colonel Griffith, the Principal Veterinary Officer, to Taufikia, near the mouth of the Sobat River, and 522 miles south of Khartoum. The journey was undertaken in January, 1905, and at Melut, fifty miles north of Kodok (late Fashoda), a herd of Shilluk cattle was inspected. Three sick animals were picked out and examined. In the blood of one of these I found a trypanosome identical with the parasite found in Shilluk cattle at Khartoum which had come from the Kodok region.¹ Nothing was found in the blood of the other two animals, but it is probable they were suffering from the disease, as they presented the characteristic symptoms, *i.e.*, extreme anæmia of the mucous membranes, weakness, emaciation, and some running from the nose. At Melut we received vague information as to the presence of a fly-belt a considerable distance inland, and were told that the cattle became infected after the rainy season, *i.e.*, in August. On these cattle, as in those at Khartoum, large numbers of the tick called *Amblyomma variegatum* were found, as well as flies of the genus *Hippobosca*. It may be said at once that examination of these insects has always proved negative, but, as will be shown, the trypanosomes are never very numerous in the blood of cattle.

¹ The recent discovery of *G. morsitans* in Southern Kordofan probably explains the prevalence of tsetse diseases in this district.

A herd which had just been imported from the north showed no signs of disease.

At Kodok a small herd was seen, and one sick cow, which eight months previously had come from Melut, was examined. It was distinctly thin and anæmic, but no parasites were found in its blood.

At Taufikia six separate herds of cattle were inspected, the bloods of twelve sick beasts were examined, and trypanosomes were found in one animal only—a cow from Abyssinia—which had recently aborted and was in a dying condition.

This trypanosome proved to be *T. nanum*. Three sick mules, coming also from near Itang, were found to harbour trypanosomes. These were not the same species of parasite as those found in cattle, but appear to be identical with those discovered by Head in mules from the Bahr-el-Ghazal. A dog was inoculated from one of these mules and brought to Khartoum, where it developed trypanosomiasis. It was from this strain, carried on by successive passages through animals, that I have been able to study the parasites of the disease in mules. The cow from Melut was also brought to Khartoum, and will be again mentioned in due course. At Taufikia a monkey (*Cercopithecus sabaeus*), a bat, and a black and white crow were examined, with negative results.

Out of three sparrow-like birds examined, two showed halteridia in the blood.

It is difficult to base any conclusions on such limited observations. The trypanosomiasis of cattle is a chronic disease to all appearance, and it will be some time before its prevalence is correctly gauged. In equines the malady appears to be common in the Bahr-el-Ghazal, where *G. morsitans* is found, and probably exists to a considerable extent on the Upper Sobat. On the mules at Taufikia large numbers of a species of *Stomoxys* were found, biting fiercely, specially in the evenings. No opportunity of properly examining these flies was afforded. In one, which was dissected, no trypanosomes were found, but several hours had elapsed before its stomach contents were examined. One may here refer to human trypanosomiasis, which so far has not been encountered within the confines of the Sudan, though, as previously noticed, Dr. Neave (3) found Leishman-Donovan bodies in the spleen of a boy coming from Meshra, in the Bahr-el-Ghazal. At Taufikia I found that a Sudanese battalion was being recruited to some extent from Uganda, and discovered that twelve men had come from Kampala, close to Entebbe, a centre of the disease. Some of these men exhibited enlarged cervical glands. They were tested by blood examinations, gland puncture, and, in one specially suspicious case, inoculation into a monkey (*Cercopithecus*), but with wholly negative results. Later they were sent for observation to Khartoum, and were re-examined, but no trypanosomes were found. The presence of these men at Taufikia, however, served to draw attention to what was undoubtedly a source of danger. Recruiting from Uganda has been abolished.

Lieutenant Gray (4) has shown that the country immediately south of Gondokoro is not of the kind likely to harbour *G. palpalis*, and neither Dr. Neave nor I saw anything of tsetse-flies on the Upper White Nile. As *G. morsitans* haunts the forest districts of the Bahr-

el-Ghazal, there is nothing to prevent *G. palpalis* being likewise an inhabitant, and Dr. Neave's trip through that region may serve to settle this important question.¹

(2) *The Disease in Cattle*.—Cattle trypanosomiasis has been studied in Khartoum, Melut, and Taufikia. The disease appears to be of a chronic nature, the principal symptoms being extreme anæmia, especially visible in the blanched, glistening, conjunctival surface, weakness, emaciation, running from the nose, and occasional dripping of urine. The last condition is probably dependent on muscular weakness. Plate III., fig. 1, gives a good idea of an animal suffering from the disease. Notice the dull, listless, half-closed and sleepy eye, the prominent ribs and hip-bones, and, what is rather constant, the atrophic line in the shoulder hump. In the later stages the head is held low, and towards the end there is complete collapse, the animal lying down and refusing to rise, the skin cold, the coat roughened, urine and faeces passed involuntarily, and the respirations noisy and rapid. At this stage the animal may take food, and, indeed, failure of appetite does not at any time seem to be a symptom. Careful examination failed to detect enlarged glands towards the root of the neck, but one is apt to be deceived by feeling the subcutaneous gelatinous exudation which is found to exist *post mortem*. The first ox from which specimens were obtained died some fifteen miles from Khartoum. Smears of the peripheral blood, liver and spleen were submitted to me by Captain Head. In all of these I found the small trypanosome since named *T. nanum* by Professor Laveran. Captain Head also brought in some of the cerebro-spinal fluid, which was centrifuged, and in the sediment streptococci, possibly due to contamination, and altered and amoeboid forms of the parasite, were found. The latter resembled those described by Plimmer and Bradford (5) in bone-marrow in cases of nagana, and by Castellani (6) as occurring in the cerebro-spinal fluid in sleeping sickness. They were few in number and stained feebly. A somewhat pear-shaped, flagellated form was the most striking.

The second ox also died at a distance. In smears made from its blood trypanosomes were fairly numerous. The stomach, which has been placed in spirit, was the only organ brought to the laboratories. Attached to it was a small piece of omentum. On opening the stomach, a very curious condition of pigmented ulceration was disclosed, affecting the mucous membrane (Plate III., fig. 2). Scattered about were dark areas with thickened edges raised above the surrounding mucous membrane. The surfaces of these areas were flat and slightly depressed, and consisted of what was afterwards found to be altered blood clot. No smears were made from these areas, but sections were cut and examined. Beyond a severe bacillary invasion and the appearance of considerable

¹ Dr. Neave did not find *G. palpalis*, but it has been reported as existing at Wandī, in the Lado Enclave, and at Mvolo, in the Bahr-el-Ghazal. The report requires confirmation. I have recently heard that Major Bray, of the Egyptian Medical Service, has sent to Khartoum a specimen of a fly taken near Mvolo. It is believed to be *G. palpalis* by Captain Ensor, who examined it, and is my informant.

erosion and destruction of the mucous membrane, nothing was found.

The following are my notes on the condition :—

Examination of Abomasum or Fourth Stomach—Cardiac End.—Nothing noticeable externally. In a small piece of attached omentum there are two enlarged glands about the size of peas, rounded, elastic to the touch, purple in colour externally, and deep purple on section. The mucous membrane is of a uniform dark slate colour, no ecchymoses are present, but there are some dark patches, possibly due to *post-mortem* changes. Studded over the surface of the mucous membrane are spots of intensely black pigment (Plate III., fig. 2). Each of these, in most instances, seems to surround a tiny punched-out hole, and the pigmentation is most marked in the central depression. A few black granules can, as a rule, be squeezed out from the central pits. These granules were found to consist of altered blood. Where the patches are more advanced they present the appearance of ulcerations. Most of these are more or less circular and depressed, but some are in the form of ulcerated streaks, and all are intensely black. In addition there are a few patches of superficial pigmentation in which there is no ulcerative process.

Central Portion.—The condition is very similar, but the patches are larger, some of the ulcerated "streaks" being $\frac{3}{4}$ inch in length. In one or two places the ulcerations appear to have healed, leaving depressed and whitish scars surrounded by areas of slight pigmentation.

Pyloric End.—Nothing noted externally. The mucous membrane shows a general pigmentation of the surface in the form of little circular shallow pits with pigmented walls, the pigmentation being very slight. In addition, pigmented ulcers similar to those previously described are present in considerable numbers, and in some instances a regular plug of the black material fills up the ulcer, and rises above the surface of the mucous membrane. There are also present the superficial pigmentations already mentioned, some of which are associated with slight erosion. Where ulcers are marked their edges are thickened. The ulcerative process and the pigmentation are confined to the mucous layer. In no instance does perforation seem to have occurred. Size of largest ulcer, $\frac{3}{4}$ inch by $\frac{1}{4}$ inch.

At the time I did not think that these ulcerations, which rather recalled the lesions produced by the swallowing of a corrosive poison, were in any way connected with the trypanosomiasis. Since then I have had reason to alter that opinion, as will be seen when we consider the experimental work with the trypanosomes of mules. Lieutenant Gray, whom I met on his way to England from Uganda, informed me that he had recently found a similar condition of ulceration in the stomachs of natives dead of sleeping sickness.

The third ox is that shown (Plate III., fig. 1). The blood was taken at Khartoum on October 30th, and as many as two trypanosomes were found in some fields. The animal was kept and well fed. On November 4th fresh and stained blood films were examined, but no parasites could be demonstrated. Thereafter, though the blood was centrifuged and

examined, and though the animal was subjected to four days' partial starvation, trypanosomes were not again found. Eventually, as the owner wished to slaughter the ox, it was exchanged for Ox No. 4, which was examined on November 23rd, when a considerable number of trypanosomes were found, as many as six per cover-glass preparation being present. This ox continued to show the parasites in its blood, and gradually became thinner and weaker.

On December 3rd it was found to be very weak, with marked anæmia and dribbling urine. The urine and fæces were examined for blood, but none was present. The fæces were slightly tarry in consistence, and this and their colour suggested the examination.

On December 4th the ox was found to be *in extremis*. Trypanosomes were slightly more numerous in the blood, and as it was feared the animal might die during the night it was slaughtered and an autopsy performed immediately.

The principal points noted were :—

(a) The extensive subcutaneous, gelatinous, and pale yellow exudation. Nearly every part of the subcutaneous connective tissue was in an oedematous, watery condition, which was most marked where the skin was loose, *i.e.*, in the dewlap, behind the shoulders and in front of the haunch.

(b) The presence of enlarged, purple, hæmorrhagic glands about the root of the neck.

(c) The great and general enlargement of the mesenteric glands, which were also, though to a less extent, hæmorrhagic in nature.

(d) The presence of a certain amount of chronic meningitis affecting the pia arachnoid, the pia being somewhat adherent to the surface of the convolutions. There was little thickening of the membranes, and no appearance of encephalitis; indeed, the brain appeared markedly anæmic. The stomach, which was distended with food, presented no ulcerative condition, but contained "hots" of a different kind to any I have seen in the Sudan. The intestinal tract was normal. There was nothing special to note with regard to the spleen and liver, which were neither congested nor enlarged. The heart's blood showed trypanosomes. Fluid from the lateral ventricles of the brain and from the cerebro-spinal fluid showed nothing in the way of trypanosome infection. Bile taken with aseptic precautions from the gall-bladder contained a short stout bacillus in considerable numbers, but no flagellated parasites.

The cow at Melut was picked out by the natives as being ill. The blood was collected in tubes containing citrate of soda solution. Such blood showed trypanosomes, though these were only found after some searching.

The Abyssinian cow which aborted at Taufikia, and was in a dying condition, also had trypanosomes in its blood, but they were not at all numerous. Time did not admit of a *post-mortem* examination in this case.

The trypanosome concerned is a small one. It is not very active in fresh films, and I have never seen one traverse the whole field of the microscope. The motion is undulating, combined with a vigorous slashing to and fro of the anterior part of the body, which tapers to a very tiny flagellum. Rippling and what

may be termed spreading movements have also been observed. The parasite advances usually with the narrow end in front, but this motion is often reversed, and I have seen one move a considerable distance, pushing aside the erythrocytes with its blunt posterior end. A fact which is very noticeable is that the trypanosome tends to adhere to the red blood corpuscles. Even in a thin field this is seen, the parasite seeming to take a delight in butting and boring at the erythrocytes. Frequently it gets beneath them and is lost to view, the agitation it produces being the only clue to its presence. Having studied this trypanosome, both in the living and stained condition, and having conducted a few inoculation experiments on laboratory animals (*vide infra*), I became convinced that this was either a new and undescribed trypanosome, or was identical with the parasite of cattle found by Bruce, Nabarro, and Gray, on the shores of the Victoria Nyanza in Uganda. Stained specimens were sent to the Liverpool School of Tropical Medicine, but I learn that unfortunately the stain had faded and could not be repeated with success. In the meantime I had sent unstained films to Professor Laveran, (7) to whom I am much indebted for his kindly interest, and who, in the *Proceedings of the Biological Society of Paris* of February 24th, describes the stained trypanosome, which he regards, provided further experiments prove it to be peculiar to cattle,¹ as a new species, and which, on account of its small size, he has named *T. nanum*.²

His interesting description of these parasites is as follows:—

"The trypanosomes measure 10 to 14 μ in length, by $\frac{1}{2}$ to 2 μ in breadth. Their structure is that of the flagellates of the genus *Trypanosoma*, although, contrary to the rule, the protoplasm is prolonged on the anterior part in such a way that there is no free part of the flagellum, or the free part of the flagellum is extremely short. The undulating membrane is very straight, and in consequence but little apparent. The posterior extremity is conical, not drawn out, and in other respects varies somewhat. The oval nucleus is situated near the centre of the body of the parasite. The rounded centrosome, rather large, occupies a position close to the posterior extremity. The protoplasm is homogenous without granules.

"Some forms a little longer than the others show two centrosomes and a flagellum, divided to a greater or less extent, proceeding from the centrosomic insertion."

He proceeds to point out how different in morphology is this trypanosome from *T. brucei* and *T. evansi*. He compares it with *T. theileri*, the giant trypanosome of South African cattle, and concludes by remarking that while very distinct from *T. theileri*, *T. nanum* approaches it in being peculiar to cattle, so far as is at present known.

I have little to add to the above description.

The photo-micrograph (Plate III., fig. 3), for which I am indebted to Dr. Beam, Chemist to the Labora-

tories, gives a very fair idea of *T. nanum*, multiplied 1,250 diameters. It shows it to be a short trypanosome with hardly any free flagellum visible, but is not quite typical, in that the posterior moiety is rather broader than is usually seen.

I append measurements I have made of a form whose total length was 14 μ .

From posterior end of body to centre of centrosome	...	...	...	1.2 μ
From centre of centrosome to nucleus	...	...	...	4.2 μ
Nucleus	...	...	...	1.6 μ
From nucleus to beginning of flagellum	...	...	...	5.6 μ
Free flagellum	...	...	...	1.4 μ
Breadth behind nucleus	...	...	...	2 μ

I agree that the protoplasm is homogeneous, though it sometimes stains irregularly, as evidenced (Plate III., fig. 3), while in forms kept *in vitro* granules appear, for the most part anterior to the nucleus. In such forms the vacuole in the neighbourhood of the centrosome may be found large and very evident. Sometimes a portion of the free edge of the undulating membrane is clearly visible, bunched, as it were, upon the back of the trypanosome, and looking like a loop. As a rule, however, the undulating membrane can scarcely be seen, save in the living parasite. I have worked with specimens stained by the Leishman-Romanowsky method, which answers admirably if the stain be strong and staining prolonged.³

I have carried out a few experiments *in vitro* which may be mentioned here, though the study of the trypanosome is yet far from complete, owing to lack of material and press of other work. Hence cultivation experiments have not yet been attempted.

In citrated blood kept at a temperature of 22° to 23° C. no change in the trypanosome was visible after twenty-four hours. They remained lively and stained well. After seventy-two hours at a temperature of 25° C. changes were observed to have occurred, the posterior ends of the parasites having become swollen, while the organisms were sluggish and evidently degenerating.

Trypanosomes disappeared in twenty-four hours from sterile citrated blood which had been exposed to a temperature of 16° C.

The trypanosomes from the Melut cow remained alive in non-sterile citrated blood at a temperature of about 35° C. for twenty-four hours. They underwent longitudinal division, forms with two centrosomes and two nuclei being seen. In these the undulating membrane was more apparent than usual.

Inoculation Experiments.—From Ox. No. 1, 0.5 cc. citrated blood, i.e., about 0.25 cc. blood, was inoculated subcutaneously into a monkey (*Cercopithecus sabaeus*) on October 30th, 1904.

On the same date a rabbit received 1 cc. of citrated blood. These animals never show any symptoms of the disease, and though their bloods were repeatedly centrifuged in the hæmatocrit tubes, and carefully examined both in the fresh and stained condition, no trypanosomes were found.

From Ox No. 4, on November 23rd, a rabbit received 2 cc. of blood containing a considerable

¹ I have since found a very similar parasite in the blood of mules.

² I.e., the "dwarf" trypanosome.

³ Equal parts of the fluid stain and distilled water allowed to act for twenty minutes or even longer.

number of trypanosomes, six to the microscopic field (employing Leitz obj. 6, oc. 4, without ocular diaphragm), and a monkey (*Cercopithecus*) received 1 cc. The result in the case of these animals was also negative, though they remained under observation for two months.

On December 4th a brown pariah dog received 2.5 cc. of fresh blood subcutaneously at a time when trypanosomes were fairly numerous.

A black pariah dog received as food large pieces of the liver and spleen and several of the large glands, all soft food be it noted.

These experiments also proved absolutely negative.

On December 29th the last-mentioned rabbit happened to be killed accidentally. A *post mortem* was performed immediately, but no trypanosomes were found in the blood or in any of the organs. It would appear, then, that dogs, rabbits and monkeys (*Cercopithecus*) are not liable to infection with *T. nanum*. As it was desired to institute further experiments, the cow from Melut was brought to Khartoum, arriving there on March 4th, 1905, along with her calf. The blood of both animals was examined, but no trypanosomes were present.

In the case of the cow this fact, taken in conjunction with what was found in Ox 3, seems to prove that the parasites are in the habit of disappearing from the peripheral blood. Possibly spontaneous cure may occur.

The cow was in very poor condition, and presented all the symptoms of the disease, but repeated centrifuging of considerable quantities of blood failed to reveal the parasite. The animal has been under observation for nearly a month, and trypanosomes have never been demonstrated. Later examinations made down to the end of June all proved negative, and the animal being well fed, steadily improved in health and appearance. On March 7th, 1905, 4 cc. of the cow's fresh blood was inoculated subcutaneously into her calf. At the time of writing (March 27th, 1905) trypanosomes have not been found in the blood of the latter. Nor were they discovered up to the time of the last examination in June. The fact that, as a rule, there are not many parasites in the blood of cattle makes the investigation of *T. nanum* rather a tedious matter, and explains to some extent the imperfections of the research which has so far been conducted.

(3) *The Disease in Mules.*—For the study of trypanosomiasis in mules there have been available the stained slides of blood prepared by Captain Head from mules which were brought from the Bahr-el-Ghazal. The main source of material was, however, found in the three mules suffering from the disease at Taufikia. As stated, a dog was inoculated from one of these animals and brought to Khartoum, where it developed the disease. In the mule the chief symptoms of infection are the hanging head, the dull and listless eye, the roughened, staring coat, the prominent ribs, the general aspect of hopeless resignation, and the hind-leg projected from the body, a sign of weakness and giddiness. The blood of the mules seen at Taufikia literally swarmed with trypanosomes, and was thin, greasy, and difficult to spread on the slide. One animal died, but had decomposed before we got

word of its decease. The death of a second enabled a *post mortem* to be performed. The most marked change was in the meninges, which were much thickened, the dura being very adherent to the skull. The brain was congested, and the cerebral vessels were gorged with blood. Elsewhere but little was found, the spleen not showing any increase in size or marked congestion. The liver was fatty. Unfortunately the stomach was not opened, a regrettable oversight on my part. It looked healthy viewed externally. There was no gelatinous, subcutaneous exudation, nor was the connective tissue cedematous. From the third mule the dog was inoculated, about 4 cc. being given subcutaneously on January 16th, 1905. On January 22nd trypanosomes were for the first time found in this dog's blood.

Slides of the mule's blood were sent to Professor Laveran, who describes the forms found in the same article as that in which he deals with *T. nanum*, the cattle trypanosome.

After remarking that the parasites were very numerous, he proceeded to distinguish two types (fig. A):—

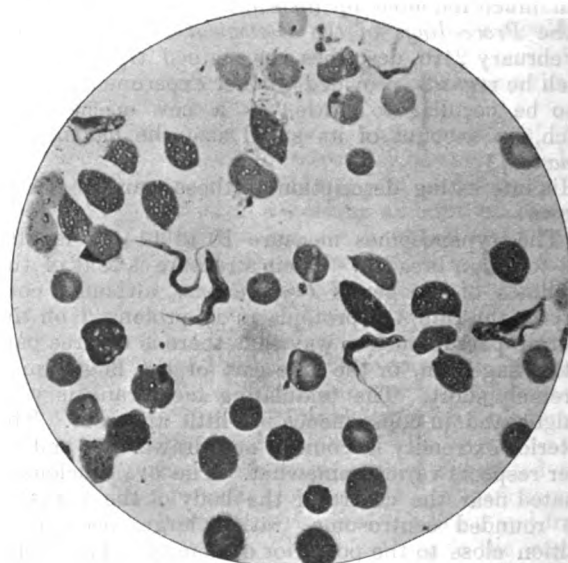


FIG. A.

(a) "Small forms measuring 12 to 14 μ in length, by $1\frac{1}{2}$ μ to $2\frac{1}{2}$ μ in breadth. These trypanosomes recall very much the appearance of the small forms of *T. dimorphum*. The protoplasm is prolonged as far as the extremity of the flagellum, which in consequence does not exhibit a free part. The undulating membrane is more developed than in *T. nanum*, but causes the parasite to present an even more 'stumpy' aspect. The nucleus is situated sometimes in the centre, sometimes at the junction of the posterior with the middle third. The protoplasm contains chromatin granules, and these are sometimes very numerous. Forms in process of division are encountered with two centrosomes and one nucleus, two centrosomes and two nuclei, &c.

(b) "Large forms measuring 21 to 30 μ in length, by 2 μ in breadth. These forms, in which the flagellum

exhibits a very long free portion, bear a great resemblance to *T. evansi*. The posterior extremity is usually elongated, the protoplasm is homogeneous and with but few granules. Forms undergoing division by separation into two elements are found. It is to be noted that intermediate forms between the small and large trypanosomes are wanting."

From a study of numerous preparations, both fresh and stained, I am in a position to add a few additional notes to the above. In fresh blood both forms of trypanosome can be clearly made out. The long forms are much the more active, darting rapidly hither and thither, lashing vigorously with their flagella and displacing the red corpuscles. They can advance with either the anterior or posterior end in front, though their longer excursions are made with the flagellum "going on before."

Occasionally one of these long active forms may be seen to traverse the field of the microscope, but this is not common. The body of the trypanosome frequently

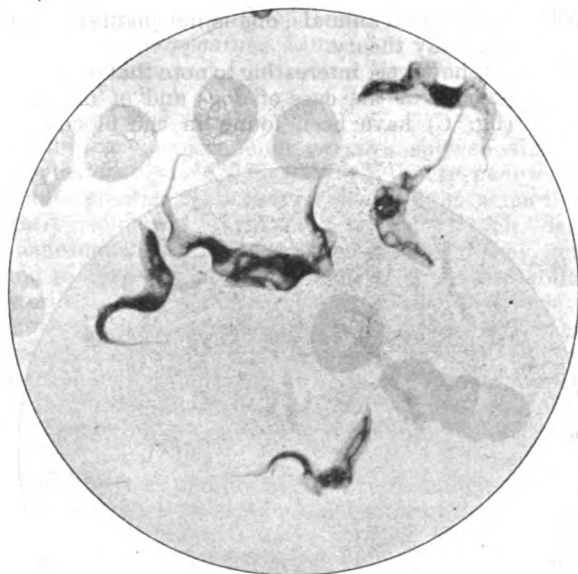


FIG. B.

bends upon itself, so that it presents the appearance of a tiny corkscrew for the fraction of a second—then stretching out, the parasite shoots across some space amongst the corpuscles, and plunges, writhing and lashing, amongst a startled group of erythrocytes. In the fresh state the undulating membrane is not very well defined in these long forms. They do not present a granular aspect. The short forms, on the other hand, are, as a rule, distinctly granular, and are more sluggish in their movements. They tend to hang about the same spot, and their excursions are limited, rather resembling those of *T. nanum*. They also can advance with either end in front, but their body movements are more of a rippling or undulating type. It often looks as though a series of shivers was running along the protoplasm. Their undulating membranes are well marked, and the rounded posterior ends are very distinct. On staining with Leishman-Romanowsky, used strong and for a considerable

time, as in the case of *T. nanum*, the differences in structure between the two forms are well emphasised. Points to which Laveran, in his short note, does not refer is the well-known "pike-head" form of the posterior end of a typical long trypanosome, and the fact that the centrosome of the long form is not as large as that of the small. In some of the short forms the nucleus seems almost to touch the centrosome, while "bunching" of the undulating membrane is often well seen. I have noted curious forms, possibly distorted, with square-cut posterior ends, and more than once have seen a short form with no granules visible.

As a rule the granules are in the posterior moiety, i.e., between the nucleus and the centrosome. In some instances the possession of these chromatin granules is almost the only point enabling one to distinguish this trypanosome from *T. nanum*. I have also noticed dividing forms, and it is not uncommon to find two short forms lying with their posterior ends in close contact, this being probably the terminal stage of a division (fig. B.).

In the mule's blood I did not observe conjugating or agglutinating or involution forms. I agree that the long forms measure from 21 μ to 30 μ , but some are as narrow as 1.4 μ at their thickest portion.

I append a very average set of measurements:—

From posterior end to centrosome	... 2.8 μ
From centrosome to nucleus	... 7 μ
Nucleus	... 2.8 μ
From nucleus to root of flagellum	... 4.2 μ
Flagellum	... 6 to 10 μ

There is much variation amongst these long forms, but as a general rule the flagella stain admirably and complete measurements can easily be made.

Here are the figures for one of the short forms of a total length of 14 μ in which the nucleus was at the junction of the posterior and middle thirds:—

From posterior end to centrosome	... 1.4 μ
From centrosome to nucleus	... 1.4 μ
Nucleus (large)	... 2.8 μ
From nucleus to root of flagellum	... 7 μ
Flagellum	... 1.4 μ

I have found short forms to vary in length from 12 μ to 15.4 μ , and in breadth from 1.4 μ to 2.5 μ . As Professor Laveran points out in *T. dimorphum*, the trypanosome of horses in Senegambia, there also exist two forms, a long and a short. He asks if this and the mule trypanosomes are identical. He regards this as possible, but mentions the fact that while the short forms of the mule trypanosome resemble the short forms of *T. dimorphum*, the long forms of the former differ a little from those of the latter, mainly as regards the flagella, which as a rule are short in *T. dimorphum*. He adds, however, that variations occur, and that Dutton and Todd have described free flagella in the large form of *T. dimorphum*. Not only are they described but they are figured both in photo-micrographs and coloured plates, and I must say that my first impression was that I was dealing with *T. dimorphum*, or something very like it. To my mind the long forms more resembled the long forms of *T. dimorphum* than they did *T. evansi*, but then my comparisons were made from photographs and coloured drawings. Laveran

goes on to state another hypothesis, namely, that the mules may have been infected with two different species of trypanosome, and he cites the work of Cayalbon who, in the French Sudan, found horses to be the victims of a double infection (8).

There seems no reason why this might not occur as regards the short forms: one at once thinks of *T. nanum*, as the mules had come from the Itang district along with the herd of cattle amongst which was the cow harbouring those flagellates, and which aborted and died as already described.

In order to try and settle this vexed question, if possible, without proceeding to cultivation methods, and also to enable one to test certain therapeutic measures, animal inoculations have been conducted.

I do not propose to consider these in detail. Dogs, monkeys (*Cercopithecus*), gerbils, jerboas, rabbits and a goat were employed and numerous experiments were performed. As a result, I was led to think that these mule trypanosomes were really *T. dimorphum*, but this belief has been somewhat shaken by the discovery of a small trypanosome existing by itself in the blood of mules coming from the Bahr-el-Ghazal. It is difficult to be certain, and in any case the tendency is to follow Koch (9) and pay less attention to differences in species, and more to the presence or absence of pathogenicity.

(4) These inoculation experiments served to show how frequently ulceration of the gastric and to a less extent the intestinal mucous membrane was present *post mortem*. References to such a condition are not wanting in the literature. Dutton and Todd (10) found stomach lesions in a baboon dead of trypanosomiasis, while Musgrave and Clegg (11) record the presence of intestinal ulcers and ulcers in the cæca of animals dead of surra in the Philippines.

As a rule, however, attention does not seem to have been paid to the condition of the alimentary tract, and, as far as I know, when lesions have been noted smears have not been taken nor any further examination performed.

My number of *post mortems* in the cases of experimental animals now totals seventeen, and in nine of these gastric congestion or ulceration or both were present. In one case there was a marked ulceration of the cæcum and lower end of the ileum, in another Peyer's patches were congested. I do not think this can be a mere coincidence. A similar condition was found in the stomach of a Shilluk ox infected with *T. nanum*, and I am inclined to think, especially since hearing of Lieut. Gray's observations, that such lesions will be found to be common in trypanosomiasis.

As to their significance, one scarcely likes to hazard an opinion, but the thought that naturally arises is whether this condition may not indicate an effort on the part of the parasite to leave its host. Biting flies are regarded as the usual medium by which trypanosomes leave the body of an infected animal, though Rogers (12) has shown that the ordinary house-fly will serve the purpose in the case of open wounds, and fleas and other blood-sucking insects are effective as agents of transmission.

At the same time the life-history of the trypanosomes of mammals is still obscure, and, so far as I know, despite the recent work of Koch at Ubebe, it has never

been definitely settled whether or not they pass a stage in the flies or other insects which serve as carriers. I understand that Lieut. Gray's recent work in Uganda bears on this subject, but I have not had an opportunity of seeing it. It is, then, not possible that the parasite may escape from the body in some different manner? If so, may the gastric and intestinal lesions not be evidence of such exit? The condition found in cachexial fever due to the Leishman bodies will at once occur to any interested in this important subject. At the same time, we are immediately met with the argument that no one has ever found trypanosomes in the stools of infected animals, nor have such stools been definitely shown to be capable, on injection, of producing the disease. Lingard, it is true, states the contrary, but he is generally regarded as having been mistaken, and Musgrave and Clegg, who paid special attention to this point, deny that the stools can convey infection. Rogers also refutes Lingard's contention. In the face of all the evidence which has been accumulated and the absence of any experiments with the stools of inoculated animals, one is not justified in putting forward any theory.

(5) It is, however, interesting to note that on several occasions, both in the case of dogs and of monkeys, spirilla (fig. C) have been found in the blood clots



FIG. C.

covering the ulcers or in smears made from the ulcerated surfaces. These spirilla, which are somewhat blunt at the extremities, measure from $2.8\ \mu$ to $7.7\ \mu$ in length, are very actively motile, and possess from four to seven short undulations. There is a general impression found chiefly on Sohandium's (13) work, that trypanosomes and spirilla will be found to be very closely related, if they are not indeed merely different stages in the life of one parasite. Moreover, Theiler, in South Africa, has found trypanosomes and spirilla existing together in the blood of cattle, and Petri (14) has found the same thing in birds. The spirilla which I describe are short forms, and have not the typical

pointed ends of, say, *Spirochaete obermeieri*. For all that they are undoubted spirilla, and I have not found such present in the stomach or intestines of animals uninfected with trypanosomiasis. I think the observation is one of considerable interest. At present it is nothing more, but it seems worth while following up the matter.

(6, 7) The therapeutic value of chrysoidin and of blood serum. I propose to deal very briefly with these points in this paper. I was led to employ chrysoidin, a yellow aniline dye, and chemically the hydrochloride and di-amido-azo-benzene, because trypan red and malachite green had been used with some success, and because I had previously found chrysoidin (15) to be very lethal in dilute solutions to fish and to the ciliated embryo of *Schistosomum hematobium*. Further, I had found that it possessed, at least as regards fish, a special affinity for the central nervous system, staining the brain and spinal cord an intense yellow. I found the same to be true of the soluble form (chrysoidin extra), prepared by the Aniline Manufacturing Company, of Berlin, in the case of the gerbil (*Gerbillus pygargus*, Linn.).

For the most part I have used Merck's chrysoidin, .1 grain of which in 10 cc. of distilled water constitutes a saturated solution.

Preliminary experiments *in vitro* showed that in a proportion of 1 in 500 it killed the trypanosomes of mules practically instantaneously, at the same time slightly colouring them. On staining such dead trypanosomes by the Romanowsky method they were found to take the colour badly and to have swollen posterior ends. They looked as if they had shrunk into themselves. In a strength of 1 in 6,000 some trypanosomes were observed to die in five minutes. Others though retaining their motility become rounded, and these also died after forty-five minutes. After four hours only one living trypanosome could be found. Though lively it had changed in shape and looked like an involution form. Although weaker mixtures, even 1 in 30,000, killed some of the parasites many were found to survive. In all cases controls were performed, and the blood was mixed with sterile citrate solution. No agglutination was observed. The dye was not so lethal as I had hoped, but I resolved to give it a trial, and employed it in the case of dogs, monkeys, and gerbils. Without entering into details, it may be said that as regards the trypanosome of mules the results have been somewhat disappointing. True the dye profoundly alters the parasites in the peripheral blood and sometimes causes their temporary disappearance, but I have been unable by its use to prolong the lives of infected animals or to greatly modify the course of the disease. It has been given subcutaneously and intravenously without marked smears, but it is worth while remembering that Laveran found *T. dimorphum* very resistant to the action of trypan red.

Dr. Neaves (16) employed chrysoidin in a case of human trypanosomiasis from Uganda, and found it caused the parasites, which were numerous, to disappear wholly from the peripheral blood and the juice of the affected cervical glands. I was able to confirm his observations, but succeeded in inoculating a monkey (*Cercopithecus*) by injecting several cc. of blood

taken from a vein. The disease, therefore, was not cured, but the results have been somewhat hopeful, as the patient has greatly improved in condition (fig. D), and

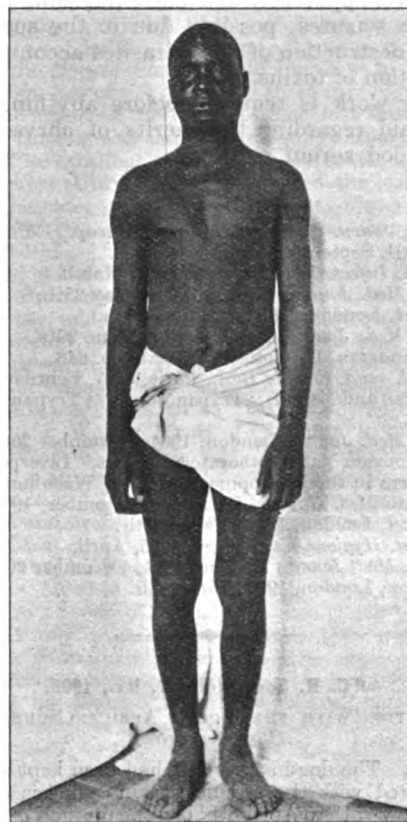


FIG. D.

chrysoidin does not cause the unpleasant staining of the mucous membranes which is one of the drawbacks to the use of trypan red. The dye is easily given by subcutaneous injection, and, if it can so greatly diminish the parasites in the peripheral blood, may yet establish itself as a useful agent in preventing the transmission of the disease.

Dr. Neave proposed testing the therapeutic effect of the blood serum of wild animals from trypanosome-infected districts on experimental animals inoculated with trypanosomiasis. He sent me a sample of blood serum from a water-buck free of trypanosomes. It arrived in good condition, a small quantity of carbolic acid having been added to it as a preservative.

I proceeded to test it *in vitro*, and found that, added in equal quantities to citrated blood containing the trypanosomes of mules, it caused agglutination in the form of irregular rosettes, the motility of the trypanosomes composing the rosettes remaining. After thirty minutes there was marked agglutination. Disintegration and death of the parasites also occurred.

I employed the serum in varying doses in the case of monkeys and gerbils, and in some instances found that it produced a remarkable effect on the parasites, completely disintegrating them, so that on staining

nothing was to be seen except the centrosomes with flagella attached.

Here again, however, I have been unable to modify the disease or prolong life. Indeed, large doses of the serum have apparently hastened the end, producing convulsive seizures, possibly due to the sudden and extensive destruction of the parasites accompanied by the liberation of toxins.

Further work is required before anything definite can be said regarding the merits of chrysoidin and of this blood serum method.

REFERENCES.

- (1) Head, *Journ. Comp. Path. and Therap.*, Edinburgh and London, 1904, September 30th.
- (2) *Journ. Infect. Dis.*, Chicago, 1905, March.
- (3) *Brit. Med. Journ.*, London, 1904, May 28th.
- (4) *Lancet*, London, 1905, February 25th.
- (5) *Brit. Med. Journ.*, London, 1903, June 20th.
- (6) *Veterinarian*, London, vol. 1., xxii., p. 648.
- (7) *Compt. rend. Soc. de Biol.*, Paris, 1905, February 24th.
- (8) Laveran and Mesnil, "Trypanosomes et Trypanosomiasis," Paris, 1903.
- (9) *Brit. Med. Journ.*, London, 1904, November 26th.
- (10) "Thomson Yates Laboratory Report," Liverpool, 1902.
- (11) "Surra in the Philippines," Report, Washington, 1903.
- (12) *Indian Med. Gazette*, Calcutta, September, 1904.
- (13) *Lancet*, London, 1905, March 25th.
- (14) *Journ. Hygiene*, Cambridge, 1905, April.
- (15) *Brit. Med. Journ.*, London, 1904, December 26th.
- (16) *Lancet*, London, 1905, June 17th.

"C. R. Soc. Biol." T. lxx., 1905.

INFECTION WITH THE NORTH AFRICAN SURRA BY COHABITATION.

Roger, J. The dog in question had been kept along with dogs infected with the equine trypanosomiasis of Algeria from January 25th to April 8th, but the method of contagion was not discovered.

"Annales de L'institut Pasteur," xix.

SOME ATTEMPTS TO CULTIVATE THE BACILLUS OF LEPROSY.

Neil, Emile M. P., claims to have cultivated the *B. lepræ* outside the human body but could not maintain his cultivations. More or less success was obtained with a variety of media, but the most successful was a bouillon made with 250 grms. of veal in 750 grms. sea-water and 250 grms. distilled water. Make distinctly alkaline, and add 40 grms. of glycerine, 8 of glucose, 10 of peptone and 20 of agar. Place in the cooler and add 1 part of yolk of egg to 4 parts of gelose in each tube.

"Journal of Hygiene," vol. vi.

FLAGELLATE PARASITE FOUND IN CULEX FATIGANS.

Ross, Major Ronald, C.B., F.R.S., recalls certain observations made by him in 1898 on certain "amoebule and flagellule," found in the intestines of mosquitoes, and suggests that the organisms found in mosquitoes by Schaudinn, and believed by him to be a stage of the *Halteridium danilewskyi* of the little owl may really be quite distinct parasites, having no connection with the avian hæmatozoon.

It is obvious, however, that it is equally possible that the protozoa referred to by Professor Ross may not, as he supposes, be purely mosquito parasites, but may really be a developmental stage of the hæmatozoa of some vertebrate. The question, however, may be safely left for the two distinguished protozoologists to discuss and settle between them.

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THE

Journal of Tropical Medicine

MARCH 15, 1906.

LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

REPORT FOR 1905.

THE Seventh Annual Report of the work of this School shows that it continues to fulfil, in an eminently satisfactory and creditable manner, the purposes for which it was founded.

Whether regarded from the point of view of the practical and scientific training it affords to a large number of medical men, or the yet higher platform of original research, the School authorities have every reason to be satisfied and proud of their achievements. The publications emanating from the School have advanced our knowledge in many directions, and enhanced the reputations of the several contributors.

The "Mary Kingsley Medal" has been bestowed by the School authorities upon Sir Patrick Manson, K.C.M.G., F.R.S.; Colonel David Bruce, C.B., F.R.S.; Dr. Laveran, and Professor Koch. The Liverpool School of Tropical Medicine has sent out expeditions to several parts of the Tropics, costing some valuable lives, and involving the expenditure of large sums of money. So important have these expeditions proved that the publication of a complete list of the several

undertakings is deemed worthy of being reproduced, as a testimony of their consequence and of the success attending them.

EXPEDITIONS.

The First (Malarial) Expedition: Major Ronald Ross, C.B., F.R.S., Dr. H. E. Annett, Mr. E. E. Austen (of the British Museum) and Dr. Van Neck (of Belgium), despatched to Sierra Leone in the summer of 1899.

The Second (Malarial) Expedition: Dr. R. Fielding Ould, despatched to the Gold Coast and Lagos, in the winter, 1899.

The Third (Malarial) Expedition: Dr. H. E. Annett, Dr. J. E. Dutton and Dr. Elliott, despatched to Northern and Southern Nigeria in the spring of 1900.

The Fourth (Yellow Fever) Expedition: Dr. H. E. Durham and the late Dr. Walter Myers, despatched to Cuba, and to Para in Brazil in the summer of 1900.

The Fifth (Sanitation) Expedition: Major Ronald Ross, C.B., F.R.S., and Dr. Logan Taylor, despatched to Sierra Leone in the early summer of 1901.

The Sixth (Trypanosomiasis) Expedition: Dr. J. E. Dutton, despatched to the Gambia in the autumn of 1901.

The Seventh (Malarial) Expedition: Dr. C. Balfour Stewart, despatched to the Gold Coast in November, 1901.

The Eighth (Sanitation) Expedition: Major Ross, despatched to Sierra Leone on February 22nd, 1902.

The Ninth (Malarial) Expedition: Major Ross, accompanied by Sir William Macgregor, K.C.M.G., the Governor of Lagos, despatched to Isemaila, September 11th, 1902.

The Tenth (Trypanosomiasis) Expedition: Dr. J. E. Dutton and Dr. J. L. Todd despatched to the Gambia and French Senegal on September 21st, 1902.

The Eleventh (Sanitation) Expedition: Dr. M. Logan Taylor, despatched to the Gold Coast from Sierra Leone on October 11th, 1902.

The Twelfth (Trypanosomiasis) Expedition: Dr. J. E. Dutton, Dr. J. L. Todd, and Dr. C. Christy, despatched to the Congo Free State on September 23rd, 1903.

The Thirteenth Expedition: Professor Rupert Boyce, M.B., F.R.S., Dr. Arthur Evans, M.R.C.S., and Dr. Herbert H. Clarke, M.A., B.C.Cantab., were despatched to Bathurst, Conakry and Freetown on November 14th, 1904, to report on the Sanitation and Anti-malarial Measures in practice at the towns visited.

The Fourteenth Expedition: Lieut.-Col. G. M. Giles, M.B., F.R.C.S., Indian Medical Service (Rtd.), and Dr. R. Ernest McConnell, M.D. (Canada), despatched to the Gold Coast on December 31st, 1904.

The Thirteenth and Fourteenth Expeditions were sent to West Africa in appreciation of Sir William MacGregor's great services to health and sanitation in West Africa.

The Fifteenth (Yellow Fever) Expedition: Dr. H. Wolfers-
stan Thomas and Dr. Anton Breinl, despatched to the Amazon in April, 1905. Both members of the Expedition contracted yellow fever and Dr. Breinl had to be invalided home.

The Sixteenth (Yellow Fever) Expedition: Professor Boyce, F.R.S., despatched to New Orleans in August, 1905, to observe the work of the United States Medical Authorities in dealing with the outbreak of Yellow Fever there. Professor Boyce subsequently visited British Honduras at the special request of the Colonial Office, to make a report on the conditions existing in that Colony with reference to a recent outbreak of Yellow Fever.

The paragraph in the Report referring to the death of Dr. J. E. Dutton, whilst engaged upon scientific work on the Congo, is a fitting testimony to a distinguished man who lost his life in the cause of humanity.

THE LATE DR. J. E. DUTTON.

It was with the deepest regret that the Committee learned of the sudden death of Dr. Dutton, Walter Myers Fellow, at Kosongo, on the Congo, on February 27th, while actively

engaged in the investigation of trypanosomiasis and tick fever. In 1903, Dr. Dutton, accompanied by Dr. Todd, proceeded to the Congo to investigate trypanosomiasis and other tropical diseases. Towards the end of 1904 they had reached Stanley Falls, and independently they were able to demonstrate the cause of tick fever in man—a discovery made a few weeks previously by Ross and Milne in the Uganda Protectorate. Further, they were able to prove the transference of the disease from man to monkeys by means of a particular species of tick. During these investigations both observers contracted the disease. The last letter received from Dr. Dutton was dated Kosongo, February 9th, when he seemed in excellent spirits. In his death, the Tropical School and the University have suffered the loss of a most brilliant graduate. Although only twenty-nine years old, he had already won a recognised position throughout the scientific world.

Educated at the King's School, Chester, Dr. Dutton proceeded to the University of Liverpool, where he rapidly made his way, and in 1897 he was appointed to the George Holt Fellowship in Pathology, which gave him the opportunity for research. Dr. Dutton entered the Royal Infirmary, where he acted as house surgeon to Professor Rushton Parker and house physician to Dr. Caton. In 1901 he was elected to the Walter Myers Fellowship in the Tropical School. His first expedition to West Africa took place in 1900 when, with Dr. Annett, he visited Nigeria. In 1901 he proceeded alone to the Gambia, and drew up a most comprehensive and useful anti-malarial report which has proved of the greatest service to that colony. It was during this expedition that he identified in the blood of a patient of Dr. Forde, the Medical Officer of Bathurst, a trypanosome belonging to a group of animal parasites which had hitherto been found only in animals. He accurately described and named it. Subsequently he found the same organism in numerous other patients in the Gambia and elsewhere. It can hardly be doubted that this brilliant discovery of the first trypanosome in man by Dr. Dutton was an important step in leading to the discovery of the cause of sleeping sickness, which was subsequently shown by other observers to be due to the same parasite. In addition to his discovery of *Trypanosoma gambiense*, he also described several other trypanosomes new to science. In 1902 he proceeded with Dr. Todd to Senegambia, and drew up a report on sanitation, which was presented to the French Government, and further papers on trypanosomiasis which were published. The present expedition to the Congo was sent out in 1903. Dr. Dutton was accompanied by Dr. Todd and Dr. Christy, the latter returning to England in June last.

It will be seen from this account that, although only twenty-nine, Dr. Dutton had accomplished a vast amount of useful work, and had advanced in a most striking manner our knowledge of medicine. Medical science has lost one of its most promising and distinguished men. The City of Liverpool mourns the loss of one of its most gifted students, and his colleagues in the University and the Royal Infirmary have lost one who combined with a great intellect a charming personality, which made him beloved by all.

About 900 cases of various tropical diseases have been treated at the special ward of the School in the Royal Southern Hospital since the School's opening, including cases of sleeping sickness. Students receive their clinical instruction in this ward.

Students to the number of 150 have already taken out the course of instruction. These students have been medical officers of nearly every nationality, and in almost every case have been men holding responsible official positions in tropical countries, who have realised the value of what may still be considered as a new departure in medical research.

Reviews.

LECTURES ON TROPICAL DISEASES. Being the Lane Lectures for 1905. Delivered at Cooper Medical College, San Francisco, U.S.A., August, 1905. By Sir Patrick Manson, K.C.M.G. London: Archibald Constable and Co., 16, James Street, Haymarket, S.W. 1905. Pp. 230. Illustrated. Price 7s. 6d.

Every medical man interested in tropical medicine will welcome this volume. It is needless to say that the subject is presented in that fascinatingly educative style of which Sir Patrick Manson is master. Not only are the several diseases described with accuracy as regards their pathology, etiology, prophylaxis and therapeutic treatment, but from the first to the last page the subject matter is presented in a form which teaches one to regard tropical pathology, and all that appertains to it from the higher platform of public health and racial welfare. Of the ten chapters, under which the lectures are arranged, the first six are devoted to descriptions of such diseases as Epiphytic Disease of the Skin, Ankylostomiasis, Dracontiasis, Endemic Hæmoptysis, Bilharziosis, Filariasis, Malaria, Trypanosomiasis and Sleeping Sickness; Kala-Azar and other diseases of lesser importance in regard to their epidemicity. Chapters VII. and VIII. deal with the Diagnosis of Tropical Fevers; Chapter IX. is concerned with Treatment. The last chapter is the one to which medical men, acquainted with tropical ailments, will turn, namely: "Problems in Tropical Medicine." Under this heading the reader will find a wealth of suggestions and scientific deductions which must prove stimulating to thought and research. Yellow Fever, seeing that the lectures were delivered to an American audience, naturally occupies considerable space in the matter of "Problems," but the treatment of this subject has direct bearing upon the principles to be followed in research in other diseases and in other countries. Sir Patrick, discussing the Creole immunity to yellow fever, adopts "as a working hypothesis that there are two strains of yellow fever virus, one of great virulence, one of little virulence. Specifically the same, they are mutually protective. They differ only in their respective pathogenicity. The relationship pertaining between them recalls that between small-pox and vaccinia, and the native in the endemic area acquires his immunity against the virulent disease from having had the non-virulent disease already." It is useless, however, attempting to quote jottings from a book which is a consecutive whole, and every word of which is interesting, educative, and a stimulant to the pursuit of research and observation. The book will remain a classic, long after many of the subjects it deals with are further elucidated, for the store of knowledge it embraces and the suggestions as to future investigations it contains are no mere ephemeral speculations, but deductions founded on a logical basis which increased knowledge may prove to correct but cannot upset.

THE WEST AFRICAN POCKET BOOK.

The West African Pocket Book is a happy idea. It is not merely in name but in form and style a pocket

book which any one travelling can always carry about in the pocket. We have nothing but praise for its contents. It is intended as a guide for newly appointed Government officers, and has been compiled by direction of the Secretary of State for the Colonies. Within fifty-nine pages it gives concisely and in simple language excellent information and directions as to outfit, personal hygiene, food and drink, care of quarters, travelling and bush life, precautions to be taken against malaria, and treatment of some of the more common diseases and accidents when the help of a medical man cannot be obtained. The pocket-book is worthy of every commendation, and the Colonial Office are to be congratulated on its issue. It is to be obtained from Waterlow and Sons, London.

Correspondence.

THE TEETH OF CENTRAL AFRICAN NATIVES.

To the Editor of the JOURNAL OF TROPICAL MEDICINE.

SIR, In your issue of October 2nd last there are some remarks by a Dr. G. A. P. Ross on the teeth of Central African natives. I did not see the article to which he refers; I have not long been a subscriber to your Journal.

I beg to correct the following statement with reference to the Angoni tribe: viz., "Their food is entirely vegetable, consisting of rice, mealies, and ufa (mealies and Kafir corn mixed.)"

Probably the older of the men he examined had never heard of rice in their boyhood. Until a few years ago rice was only grown at one station on the western shore of Lake Nyassa, where its cultivation was probably started (and certainly encouraged) by H.M. Administration.

The Angoni are almost entirely confined to the highlands, where they can hardly grow rice, so it must be rarely that rice enters into the Angoni villager's diet. Of course as a European carrier rice would be the usual ration.

Presuming "mealies and Kafir corn" to mean Indian corn and millet respectively, it does not follow that because these are their ordinary food that they take them mixed and call it "ufa," as the writer states. "Ufa" is simply the native name for flour, and may be made from maize, millet, or other smaller native grain. This flour, with beans, vegetable marrows, wild green herbs, and whole maize roasted as a cob in the embers of a fire, or as separated grains on a shovel, like coffee-beans often are, is the daily dietary of natives in the villages.

Again, they are not vegetarians from choice: they keep goats and pigs, and some have sheep and cattle, while their poultry sleep in their houses with them; and not only do they eat meat whenever they can get it, and eagerly join a shooting party as carriers, but one may often see a gang of Angoni labourers after the day's work hunting the grass for field rats and mice for the evening stew-pot, and Europeans' cats often disappeared for the same purpose.

It will be seen, therefore, that it is rather because practically the whole grain is eaten by natives, and to their care of the teeth, than to absence of meat from their diet, that must be held to account for the high percentage of good teeth amongst Central African natives.

I am, &c.,

East Africa,

February 6th, 1906.

J. E. S. OLD, M.D.

ABSENCE OF FEVER IN QUARTAN MALARIA.

To the Editor of the JOURNAL OF TROPICAL MEDICINE.

DEAR SIR,—Reading the interesting remarks of Dr. Wellman in your issue of February 1st ult., concerning absence

of fever in quartan malaria, the following observations may be of interest.

This country varies enormously in the malarial index in different parts, the index being 100 per cent. to 80 per cent. in low-lying, wet situations and in parts of Jerusalem; in the upland villages Ramallah, for instance, the splenic index, is only 4.8 per cent. (in 232 children, 10 years and under).

(1) A Jewish woman, showing quartan rosettes in the peripheral blood in hospital, had had no fever for several days; the spleen was considerably enlarged, and there was well-marked cachexia.

(2) A girl of 12 years or so, after severe attacks of fever, denied any rise of temperature for over two months; she was very cachectic, had enlarged spleen, and showed numerous pale rings and crescents in the blood.

(3) Two other patients, showing sparse quartan and tertian parasites, had had no fever for ten and twelve days respectively.

(4) A healthy European, engaged in archaeological work, on the first day of fever showed numerous tertian forms, including spores and equally numerous gametes. This leads to an interesting query as to the date of appearance of gametes in tertian fever; so far as I have seen, crescents are not seen until seven days from onset of fever. This patient had had no fever for months to my knowledge.

Another point of interest is, that whereas malaria is very little in evidence in winter (one case per diem or less), almost all of these have proved to be quartan in character under the microscope, and Dr. Masterman, working in Jerusalem, has noted the same in a marked manner, from clinical evidence. In this country there would seem to be no preponderance of tertian fever in spring, as in Italy, or of subtertian malaria in autumn, when tertian fever is commonest.

I am, yours faithfully,

Ramallah, Jerusalem,
February 15th, 1906.

JOHN CROPPER.

Drugs and Remedies.

PREPARATIONS BY MESSRS. PARKE DAVIS AND CO.,
111, QUEEN VICTORIA STREET, LONDON.

(1) *Fluid Extract of Cassia Beareana*.—This species of cassia, introduced by Dr. O'Sullivan Beare, has obtained considerable reputation as a therapeutic agent in the treatment of blackwater fever and of ordinary malaria. Messrs. Parke Davis have prepared a fluid extract which ensures stability of dosage and portability without deterioration.

(2) *Antimalaria Tablets*.—Each tablet contains: quinine sulph., 3 grains; powdered nux vomica, gr. $\frac{1}{4}$; powdered capsicum, gr. $\frac{1}{2}$; and extract of hyoscyamus, gr. $\frac{1}{2}$. The components of this tablet are eminently suitable for tropical residents; the introduction of capsicum harmonises with the ideas entertained by native practitioners in the Tropics as to the virtues of "spices" in decoctions prepared by them.

(3) *Warburg's Tincture Tablets*.—Each tablet represents a fluid drachm of the Warburg's well-known tincture. There can be no doubt of the efficacy of Warburg's tincture in the treatment of febrile ailments in tropical countries, more especially when marked gastro-hepatic derangements accompany the illness. Its efficacy in remittent malaria is undoubted.

(4) *Acetozone* in solution is powerfully germicidal, and possesses the advantage of being non-toxic. At the strength of 1 in 1,000 in typhoid, 1 in 2,000 in

dysentery and cholera, and 1 in 3,500 in intestinal fermentation, acetozone has proved highly beneficial.

(5) *Hamabic Hypophosphites* is an elegant preparation, palatable and suitable in debility and anæmia, especially when these are the result of acute and sub-acute illnesses.

Notes and News.

BERMUDA.

The Medical Board appointed to enquire into the medical qualifications of persons desiring to register as medical practitioners in Bermuda consists of: Eldon Harvey, F.R.C.S. Eng., L.R.C.P. Edin.; Dudley Cox Trott, M.B., B.C. Cantab., F.R.C.S. Eng., &c., &c.; and William Eldon Tucker, M.B., B.C. Cantab., &c.

PLAGUE.

PREVALENCE OF THE DISEASE.

		Cases.	Deaths.
India.—Week ended	Jan. 27th	—	3,747
"	Feb. 3rd	6,116	5,042
"	" 10th	7,116	5,890
S. Africa.—Week ended	Feb. 3rd	0	0
"	" 10th	0	0
Mauritius.—Week ended	Feb. 8th	1	1
"	" 15th	1	1
"	" 22nd	0	0
"	" 29th	0	0
Hong Kong.—Week ended	Feb. 3rd	2	2
"	" 10th	6	6
"	" 17th	5	4
"	" 24th	12	12
"	March 3rd	8	7

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

Sec. I., "Kwai Medical Journal," Johan, December 31, 1905.

EXPERIMENTS ON DOGS DURING KAK'KE (BERI-BERI) INVESTIGATIONS.

Baron Takaki fed three dogs on vegetable diet (including rice) and three dogs on a diet containing beef. The dogs fed on vegetables only increased in weight markedly at first, but later became thin, feeble, lost sensation and motion in the hind limbs and died. The dogs fed on beef and vegetables gained in weight more slowly and remained healthy and strong. Takaki concludes that increase in weight is no evidence of health.

"Semaine Médicale," September 13, 1905.

MALARIAL PERITONITIS.

Gillot, V., describes a case of acute peritonitis occurring in a patient in whom the malaria parasite was found in the blood. The peritonitis yielded to treatment by quinine.

"Presse Medicale," December 30, 1905.

OVA IN THE INTESTINAL PARASITES; TECHNIQUE OF OBSERVATION.

Letulle, M., recommends for the diagnosis of the presence of ova in the faeces, that (a) in the case of a fluid stool, after centrifugalisation a drop of sediment is taken for examination; (b) solid faeces are first dissolved in water, and then treated as in the case of a fluid stool. The ova possible to isolate in this manner are those of (1) *Ascaris lumbricoides*, (2) *Oxyuris vermicularis*, (3) *Bothriocephalus latus*, (4) *Trichocephalus dispar*, (5) *Ankylostoma duodenalis*, and (6) *Bilharzia hematobium*. In his paper, Letulle gives careful drawings of the ova of these parasites.

"American Journal of Medical Sciences," January, 1906.

Thomas, J. B. Report on the action of various substances on pure cultures of the *Amoeba dysenteriae* and cholera spirilla. The following laboratory experiments by Thomas are interesting, and may be of clinical value:—

(a) The following retarded the growth of *Amoeba dysenteriae* and cholera spirilla in thirty minutes: Acid tannic, 1 in 100; quinine sulph., 1 in 1,000; cupri sulph., 1 in 2,000; potassium permanganate, 1 in 4,000.

(b) Retarded the growth within thirty minutes: Quinine sulph., 1 in 500; protargol, 1 in 500; argyrol, 1 in 500; potassium permanganate, 1 in 2,000; argenti nitrate, 1 in 2,000.

(c) Destroyed amoeba in fifteen minutes, with only slight effect on cholera spirilla: Thymol, 1 in 2,500.

"Gazetta Degli Ospedali edelle Cliniche," January 7, 1906.

Conti, A. A clinical note in a case of chronic spasm of the region of the accessory nerve of Willis due to malaria.

"Journal American Medical Association," February 3, 1906.

(1) Wilkinson, H. B. "Leprosy in the Philippines, with an Account of its Treatment with the X-rays." Wilkinson finds that treatment of one leprosy spot produces improvements in spots in other parts of the body which in their progress advance parallel to and just as complete as in the spot exposed to the X-rays. He therefore assumes that the leprosy bacilli are killed by the treatment, and that their bodies, reabsorbed into the blood, are the immunising and curative factors. He finds the more pronounced the cure the better does the X-ray treatment serve—a phenomenon he explains by the fact that the more pronounced the disease the more bacilli are present, and, therefore, the more immunising agents, in the form of dead bodies of bacilli, are produced. A parallel immunisation is that provided in plague by using injections containing the dead bodies of the plague organisms; in the case of leprosy, however, as treated by X-rays, the culture medium is not produced in the laboratory, but is no other than the human body itself.

(2) Gorgas, W. C. "Mosquito Work in Relation to Yellow Fever in the Isthmus of Panama."

"Arch. f. Protistenk.," T. vi.

REPRODUCTION OF CLEPSIDRINA OVATA.

Schnitzler, H., continues the work of Pähler on the same species of gregarine, and concerns himself mainly with the details of the changes undergone by the nucleus after the encystment of the coupled adults. He describes the formation of a very small spindle of division in each nucleus when all the chromatin and the nuclear membrane have disappeared, and also the mitoses of the reproductive nuclei during division. He confirms, with further details, Pähler's description of the phenomena of nuclear reduction by the throwing out of a polar globule which characterises the maturation of the sporoblasts or gametes (a unique instance amongst the gregarines). Lastly, he figures and describes the isogamic reproduction of the gametes in pairs. Each couple gives origin to one of the cask-shaped sporocysts with eight sporozoites, which is a characteristic of the genus *Gregarina*.

He was, however, unable to work out the evolution of the other form of cyst which is formed by a single gregarine, but suggests that the difference in the size of the sporocysts is connected with these solitary encystments.

"Arch. Zool. Expér.," 4th Series, T. iv., 1906.

RESEARCHES ON THE REPRODUCTION OF THE MONOCYSTID GREGARINES.

Brasil, Louis, follows the development of these parasites from encystment to the formation of the sporocysts. He states that, at any rate, in the four species of *Monocystis* found in earth-worms which he has examined the gametes are anisogamic. In this they resemble two others of this genus infesting the body cavity of certain marine annelids. The author describes with great care the origin and structure of the asters, their division into two, the formation of the directive spindles, the elimination during the first division of a great part of the nuclear chromatin and the division of the residual chromatin amongst the daughter nuclei.

"Sitzungsber d. K. pr. Akad. d. Wiss.," T. xlvi., 1905.

SPECIFIC DISTINCTIONS BETWEEN TRYPANOSOMES.

Koch, Professor R., draws attention to the difficulties of distinguishing between trypanosomes generally, and especially of those that act as pathogenic organisms in mammals. Their pathogenic character cannot, however, be used to distinguish them, as the animal employed in such a test might have acquired immunity. The key of the difficulty, he believes, lies in comparing not merely the adult forms, but the various evolutionary stages which they undergo. As an example, he compares the evolutionary stages of *T. brucei* in *Glossina morsitans* and *G. fuscus* with that of *T. gambiense* in *G. palpalis*. In both cases there are found in the digestive tubes of flies that have imbibed infected blood two very distinct forms: the one sort plump, with abundant, easily stained plasma and a round, spongy nucleus; the other elongated and thin, with scanty, ill-staining protoplasm and a dense, rod-like nucleus. Judging from analogy, the former are the female and the latter the male elements. Now the two species can easily be distinguished as follows:—

Female Forms.—*T. brucei*: Blepharoplast or centrosome round, and about 1 m in diameter. *T. gambiense*: Elongated transversely, and 2.5 m 5 by 1.5 m.

Dimensions.—Female forms: *Brucei*, 25 μ by 8.6 μ; *gambiense*, 37 μ by 3 μ. Male forms: *Brucei*, 40 μ by 2.1 μ; *gambiense*, 34 μ by 0.85 μ.

"C. R. Soc. Biol.," T. lix.

FREQUENCY OF TRYPANOSOME INFECTION IN RATS AND MICE.

Sabragas, J., and Muratet, L. All the specimens of *Mus rattus* examined at Bordeaux were found to be infected, but none of those of *M. decumanus* or of mice. On the other hand, a big *M. decumanus* taken at Tours was found to be infected.

Notices to Correspondents.

1.—Manuscripts sent in cannot be returned.

2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.

3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.

4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.

5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

ON A HEMIPTEROUS INSECT WHICH PREYS UPON BLOOD-SUCKING ARTHROPODS AND WHICH OCCASIONALLY ATTACKS MAMMALS (MAN).

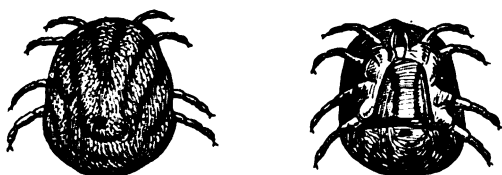
By F. C. WELLMAN, M.D.

Benguella, West Africa.

SOME months ago I mentioned (1) an insect, called by the Angola Bantus "*Ochindundu*," which preys upon blood-sucking ticks. The specimen upon which I based my remarks was taken in the act of feeding upon a very important tick of the region (*Ornithodoros moubata*) which is one of the carriers of human spirillo-sis. I have since learned that the insect itself inflicts a very painful and even dangerous bite. The specimen was sent to the British Museum, but, having heard nothing of it, I suppose it must have been lost *en route*. Since I have on several occasions referred to the insect (2), I shall here give (as well as I can in the absence of the anticipated report from the Museum and without access to a library) a few notes on the appearance, probable systematic position, bionomics, and pathologic significance of the animal.

SYSTEMATIC POSITION AND DESCRIPTION.

The insect under consideration belongs to the *Hemiptera* (Bugs) falling among the *Heteroptera*. Here it is to be placed with the *Geocores* (Land bugs), thus allying it with bed-bugs, squash-bugs, &c. It belongs to the family *Reduviidae* (3). This family is related on the one hand to the *Nabidae*, and closely on the other to the *Emesidae*. The *Reduviidae* are distinguished by having the front femora somewhat thickened, but much less than half as wide as long. Two ocelli are often present. The rostrum is short, three-jointed, attached to the tip of the head, and with the distal end, when not in use, resting upon the prosternum, which is grooved to receive it. The species are many. While I, of course, cannot definitely place

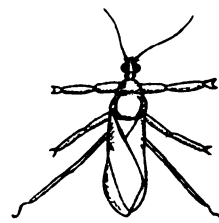
FIG. 1.—*Ornithodoros moubata*, Murray, ♀. × 2.

the species studied by me without access to descriptions and specimens of its allies, yet I have no hesitation in saying that it closely approaches *Reduvius* (*Opsicæus*) *personatus*, L. I have no description of *R. personatus* by me, but my impression is that the first two pairs of legs in the last-named bug are less thickened than in the case of the "*Ochindundu*," and other differing anatomical details very possibly exist. The "*Ochindundu*" is, like *R. personatus*, black in colour, but the first two pairs of legs are of a bright red hue. I have recently captured a similar insect which is entirely red. I present a rough sketch (fig. 2) of the "*Ochindundu*," made when the bug was first

discovered. Having, as I have said, sent the original specimen to the British Museum, I cannot offer a better drawing.

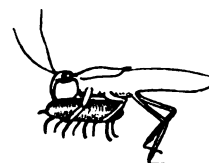
BIONOMICS.

The "*Ochindundu*" preys upon ticks, catching them and sucking, by means of its powerful piercing proboscis, the blood with which they have filled themselves. The insect is provided with curious paddle-like structures on its first four legs, which are

FIG. 2.—The "*Ochindundu*." Nat. size.

evidently designed for holding securely the tick upon which the creature feeds, the "*Ochindundu*" sitting, as it were, upon its hind pair of legs during the process. The attitude taken while sucking blood from a tick is shown in fig. 3. The only tick which I have actually seen in the clutches of the insect is *Ornithodoros moubata*, Murray. The substance of my note sent with the specimen forwarded to the British Museum is as follows:—

"I found this insect June 22nd, 1905, while studying the tick sent to the Museum some time ago (*O. moubata*, Murray). The bug was running about on the sticks composing a pig-sty where I was collecting ticks. My attention was attracted by its singular appearance and movements. Suddenly it entered a large crack in a stick and remained for some seconds. I could not clearly see what it was doing, so I had the stick split open, whereupon I found the insect in the position figured in the following sketch, hold-

FIG. 3.—The "*Ochindundu*," showing the position it assumes in the act of sucking blood from a tick (*O. moubata*). Nat. size.

ing a tick with its first four legs, and sucking blood from it, for which purpose it had inserted its proboscis deeply into the tick. The animal was so intent on its prey, that I was able to carry it to a house without disturbing it and to observe its actions for some time, and also to exhibit it in the act of sucking blood from the tick. When placed in a killing bottle, it withdrew its proboscis from its prey, but still clutched it with its legs. I mounted it in this position, and the wound may be seen in the tick near the margin of its body."

I have not determined its life-history. In some members of the *Reduviidae* hexagonal masses of eggs are deposited in any convenient spot, numbering as many as seventy or even more, and the nymphæ differ markedly from the adults. Not having seen the metamorphosis of the "*Ochindundu*," I do not know if it be (like *R. personatus*) covered in its immature stages

with the viscid substance which causes particles of dust and small fibres to adhere not only to the body proper, but also to the legs and antennæ of the last-named insect, giving to it the weird appearance from whence has come its popular name of the Masked Bed-bug Hunter. The predaceous habits of the "*Ochindundu*" are to be expected, since other members of the family live on arthropods and even higher animals, including man. One species (*Prionidus cristatus*) feeds—both its nymphæ and imagines—upon all other insects it can capture, either in the larval or adult state, occasionally even overcoming and destroying its own kind. A powerful venom is injected into the victim when the strong proboscis is inserted, and it dies almost instantly. The bug then sucks the juices out of its prey and drops the empty skin (4).

PATHOLOGIC IMPORTANCE.

The natives state that the "*Ochindundu*" regularly infests kraals and compounds for the sake of preying on ticks. This would seem to be reasonable, since many *Reduviide* are (as has been mentioned) predaceous, living on the ingested blood of hæmophagous arthropods, e.g., *R. personatus* hunts the bed-bug (*Acanthia lectularia*). The "*Ochindundu*" thus may prove to be an unpaid assistant to the tropical sanitarian, helping him in the laudable task of combating the worst of all African vermin, which infests not only native lines, but is sometimes even found in white quarters. Another point which is worth mentioning is that the natives also state that the "*Ochindundu*" itself inflicts a bite which far exceeds in painfulness that of the tick upon which it feeds. I have seen several natives who claim to have been bitten by it. One of them was seen while he was still suffering from the effects of the bite. They compare its bite to that of a poisonous snake. These statements are borne out by what I can learn of the habits of other closely allied species. A variety of *R. personatus* is stated to cause intense pain by its bite, and it is said that when unskillfully handled it always bites. Its bite, like that of the "*Ochindundu*," is said to be almost equal to the bite of a snake, the swelling and irritation lasting for about a week. In some cases it has even proved fatal. Another species (*Conorhinus sanguisugus*), known in America as the Big Bed-bug, sucks human blood at first hand. Like the two insects just mentioned, *C. sanguisugus* inflicts a most painful wound, and its bite has been known to be followed by very serious results, the patient not recovering from the effects of it for nearly a year (5). It is very probable that "bites" attributed to scorpions, spiders, wasps, &c., are in some cases inflicted by the "*Ochindundu*" and its allies, of which latter I have collected three distinct species, which I hope to have determined as soon as opportunity offers. Three possible ways in which tropical *Reduviide* may attain pathologic importance occur to one:—

- (1) By their destruction of disease-carrying creatures.
- (2) By reason of their own venomous bites.
- (3) Through their conceivable transmission of disease either directly by their own bites, or indirectly through other animals wounded and infected by them.

SUPPLEMENTARY NOTE ON THE "*OCHINDUNDU*."

Just as I am posting the MS. of this paper I have received a letter from Mr. Austen, of the British Museum, who, writing under the date of November 3rd, 1905, assures me that my collections which I feared were lost have safely reached the Museum. It will now be possible to publish a determination of the bug above described by me, which I hope will appear in an early number of this Journal.

REFERENCES.

- (1) Wellman. "The Ochihopio Tick, &c.," *Rep. to Am. Soc. Trop. Med.*, 1905.
- (2) *Id.* "On *Ornithodoros moubata*, &c.," *Ibid.*, 1905. *Id.* "An Insect which Preys upon Ticks" ("Notes from Angola," Note xv., *JOURNAL TROPICAL MEDICINE*, 1905).
- (3) Claus. "Lehrbuch der Zoologie."
- (4) Comstock. "An Introduction to Entomology."
- (5) *Ibid.*

HORSE-FLIES (TABANIDÆ) AND DISEASE.

By ERNEST E. AUSTEN.

Zoological Department, British Museum (Natural History).

If we except the Simuliidæ, which consist but of a single genus, numbering, so far as our present knowledge goes, considerably less than one hundred species, and the Hippoboscidæ, the few species of which are permanent parasites of mammals and birds, the horse-flies, or Tabanidæ, are the only family of Diptera in which the blood-sucking habit is, with a few possible exceptions, universal in the female sex. For, even among the mosquitoes, which will doubtless at once suggest themselves to the mind of every one who reads the previous sentence, there are many species—and, as the family *Culicidæ* is at present constituted, even some genera—of which the diet is all that the most ardent vegetarian could desire. But horse-flies possess yet other claims to attention. Not only are the Tabanidæ among the largest of all families of Diptera, already including as they do the enormous total of nearly sixteen hundred described species, but the flies themselves are of relatively large size. Lastly, like mosquitoes, horse-flies are practically ubiquitous. Although they probably did not contribute to the "infinite torment of flies" that added to the horrors of "The Defence of Lucknow," there are few spots on the earth's surface where horse-flies are absent; and from Alaska to Tierra del Fuego, from Siberia to Ceylon, Cape Agulhas, and the South Island of New Zealand, they force their unwelcome attentions on men and animals alike. In many parts of Africa they are especially abundant. The swarms of "serut-flies" (under which name are included several species of *Tabanus*) encountered on parts of the Upper Nile have made life burdensome to many a traveller, from the days of Sir Samuel Baker to the present time; and the many new species of *Hæmatopota* recently received from Angola and Uganda seem to show that the African continent must be regarded as the headquarters of that bloodthirsty genus.

In view, therefore, of the interest now being excited by blood-sucking Diptera as actual or potential disseminators of pathogenic organisms, it may be

worth while to devote a few moments to a consideration of the evidence tending to incriminate the Tabanidæ. Truth to tell, horse-flies, though often regarded with suspicion, have not yet been conclusively proved to be the regular conveyers of any form of disease among domestic animals or man in any part of the world. It is important to distinguish between the "regular" conveyor of a disease-causing organism and a mere accidental carrier. In the case of malaria, sleeping sickness, tsetse-fly disease, and, almost certainly, yellow fever, each malady is conveyed by certain blood-sucking Diptera, and in no other way. But when the bacilli of a disease such as anthrax are carried on the mouth-parts of a blood-sucking fly, the insect is merely a fortuitous agent. That a Tabanid or other biting fly which has sucked the blood of an animal suffering from anthrax may convey the disease to a human being, or to another domestic animal, is quite possible. The author is informed by Lieutenant-Colonel C. T. Bingham (late I.S.C.), that in Burmah mahouts believe that anthrax, which is prevalent among elephants, is carried by Tabanidæ, and on one occasion Colonel Bingham observed Tabanidæ among a number of flies on an elephant which had died from anthrax. The evidence for and against the conveyance of anthrax by flies has been well summarised by Nuttall,¹ who, however, as the result of his researches, is "struck by the very few positive cases recorded of anthrax arising from the bites of flies."² Nuttall considers that it is probable that infection by this means is "the exception and not the rule."³ In India, Rogers has succeeded experimentally in transmitting surra (a disease of horses, cattle, and camels, caused by the parasite *Trypanosoma evansi*, Steel, and closely akin to the African nagana, or tsetse-fly disease) by means of the bites of horse-flies, but the insects were used merely as inoculating needles, and transmission was direct.

In the South of France (littoral of Var à Cavalière), Louis Léger has recently met with a new flagellate parasite (described by him under the name *Herpetomonas subulata*) allied to *Trypanosoma*, in the alimentary canal of *Tabanus* (*T. glaucopis*, Mg., ♀) and *Hæmatopota*.⁴ The writer in question states that the parasite is not common, and that he has met with it only four times in sixty specimens of the genera mentioned, collected in autumn on horses and cattle. It should be noted that species of *Herpetomonas* are parasitic not only in blood-sucking flies, but also in non-biting forms, such as *Musca*, *Sarcophaga*, *Pollenia*, and *Fucellia*; but, apart from the settling of flies on abraded surfaces or wounds, it is, of course, only blood-sucking forms that are capable of infecting

vertebrates, should the parasites be found to pass part of their life-cycle in a warm-blooded animal.

In the French Sudan, according to Laveran,⁵ who quotes L. Cazalbou,⁶ the disease of dromedaries at Timbuctoo, known as *mbori*, and that termed *soumaya* or *souma*, at Ségou, which affects horses and humped cattle coming from Macina, both of which diseases are trypanosomiasis, are propagated by *Tabanus diteniatus*, Macq., and *T. biguttatus*, Wied., var. Professor Raphaël Blanchard has recently⁷ given reasons for suspecting *Tabanus nemoralis*, Mg., and *T. nigrinus*, Fabr., two South European species which are met with in North Africa, to be the disseminators of a trypanosomiasis which affects dromedaries in Algeria. Within the last few months it has been stated by Pécaud,⁸ in a paper on a trypanosomiasis of the Middle Niger (which, he says, is undoubtedly the same malady as that of Cazalbou at Ségou, referred to above, and attacks horses, mules, donkeys, and cattle), that "the animals especially attacked are those living in the vicinity of the Niger or its affluents (*marigots*). There are no *Glossina* [tsetse-flies] in this region, and consequently Tabanidæ must be charged with propagating the disease." A bare statement such as this that tsetse-flies are absent from a district in which they might well be supposed to occur, falls very far short of scientific proof that the malady is disseminated by horse-flies. More than once in recent years have species of tsetse been shown to be abundant in localities in which they had previously been declared non-existent; and even should there be no tsetse on the Middle Niger, some other biting fly, such as *Stomoxys* or *Simulium*, may abound there. Still, it may be admitted that there is at least a case for enquiry. The part played by tsetse-flies in the dissemination of sleeping sickness, as well as nagana (tsetse-fly disease of animals), shows us that if horse-flies are capable of conveying organisms that are pathogenic to domestic animals, they may quite conceivably perform a similar rôle as regards human beings, and it is hoped that this little paper may have the effect of directing the attention of readers of this Journal to the question of "Tabanidæ and Disease."

THE ANATOMY OF THE BITING FLIES OF THE GENUS *STOMOXYS* AND *GLOSSINA*.

By Lieut.-Colonel G. M. GILES, I.M.S. (Retired.)

IN the fifteenth report of the Liverpool School of Tropical Medicine, p. 14, published last year, the writer made some note of a trypanosomiasis of horses existing in Kumassi which appeared to be conveyed by a species of *Stomoxys*. Bodies which he regarded as an evolutionary stage of the parasite were found in the fluid taken from the stomach of a fresh insect dissected on the spot, but, unfortunately, the visit was

¹ G. H. F. Nuttall, M.D., Ph.D. "On the Rôle of Insects, Arachnids, and Myriapods, as Carriers in the Spread of Bacterial and Parasitic Diseases of Man and Animals. A Critical and Historical Study," *Johns Hopkins Hospital Reports*, vol. viii. (1899), pp. 1-155, Plates I.-III.

² *Op. cit.*, p. 2. ³ *Op. cit.*, p. 11.

⁴ Louis Léger. "Sur un nouveau Flagellé parasite des Tabanides," *Comptes Rendus Hebdomadaires des Séances de la Société de Biologie*, T. lvii., No. 37 (December 30th, 1904), pp. 613-615; figs. in text.

⁵ *Comptes Rendus des Séances de l'Académie des Sciences*, T. cxxxix. (séance du Octobre 31, 1904), p. 661.

⁶ *Recueil de Médecine Vétérinaire*, October 15th, 1904.

⁷ *Archives de Parasitologie*, T. viii., No. 4 (1904), pp. 578-579.

⁸ *Comptes Rendus Hebdomadaires des Séances de la Société de Biologie*, T. lx. (January 19th, 1906), p. 59.

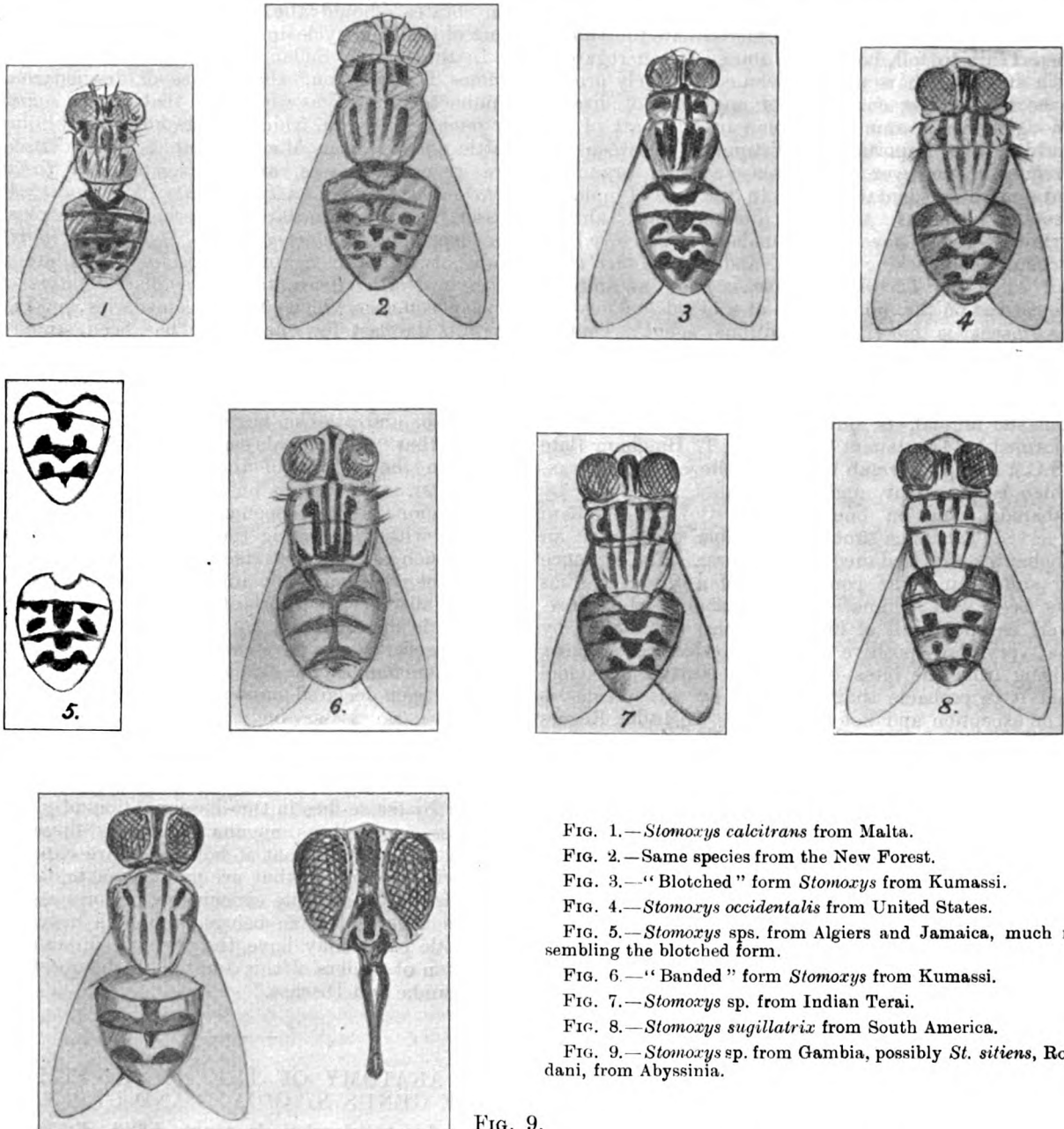
FIG. 1.—*Stomoxys calcitrans* from Malta.

FIG. 2.—Same species from the New Forest.

FIG. 3.—“Blotched” form *Stomoxys* from Kumassi.FIG. 4.—*Stomoxys occidentalis* from United States.FIG. 5.—*Stomoxys* sps. from Algiers and Jamaica, much resembling the blotched form.FIG. 6.—“Banded” form *Stomoxys* from Kumassi.FIG. 7.—*Stomoxys* sp. from Indian Terai.FIG. 8.—*Stomoxys sugillatrix* from South America.FIG. 9.—*Stomoxys* sp. from Gambia, possibly *St. sitiens*, Rondani, from Abyssinia.

FIG. 9.

so hurried, the object of our visit to the “Coast” being mainly to examine into the actualities and possibilities of anti-malarial sanitation, that little more could be done than to carefully prepare a number of the flies for subsequent microscopical examination.

The examination of this material has since been undertaken, but though bodies have been met with which it seemed might be referable to protozoal parasites, Prof. Minchin, to whom they have been submitted, does not consider that they represent stages of a trypanosome.

At an early stage of the work it became evident that some comparison with flies known to be free from disease of the sort was imperative, and it was neces-

sary to turn aside and examine English specimens of the same genus which are, fortunately, fairly easily obtainable; and some comparison with the flies of the genus *Glossina* was clearly desirable. This piece of work took up much time, and as has been seen, remains the only solid result for the labour involved.

Meanwhile a report by Prof. Minchin on the anatomy of the tsetse-fly has appeared in the *Proceedings of the Royal Society*, V. B. 76, 1905, p. 531, and a similar paper on that of *Stomoxys*, by Lieut. F. Tulloch, R.A.M.C., is in the press. The present communication, therefore, is devoted mainly to such points as are not covered in these communications, which will be quoted whenever possible, though some repeti-

tion may be unavoidable. My thanks are greatly due to Prof. Minchin for giving me advance proofs of Lieut. Tulloch's valuable paper. It may be noted that the word "stomach" in Prof. Minchin's paper should, he wishes to state, read proventriculus. As a matter of fact, it is very difficult to avoid ambiguity in the use of terms such as "stomach." Strictly speaking, the diptera have no "stomach" in the sense of a localised dilatation of the upper part of the mid-gut.

In the mosquitoes, what is called the "stomach" is the entire mid-gut, with the exception of the narrow anterior part contained in the thorax and forepart of the abdomen. In the Muscidae, including the species under consideration, there is no stomach in the sense of a localised dilatation, but the anterior part of the mid-gut forms a long tube of sausage form, and has distinguishable characteristics from the parts behind. Lowne, in his classical work on the blow-fly, calls this the "chyle stomach," and the continuation of the tube as far as the point of entry of the Malpighian tubes the "proximal intestine," while, between this and the commencement of the rectal valve is a short piece of intestine which he speaks of as the "metenteron," distal intestine, or hind gut. What Professor Minchin speaks of as the "sucking stomach" Lowne usually calls the crop, and as it is difficult to ascribe any aspiratory function to this organ the former term is to be preferred, although it is placed in the abdomen, and not in the neck, like the crop of a bird.

These explanations are necessary, as frequent references to Professor Minchin's account of the anatomy of *Glossina* are necessary to avoid needless repetition of work already performed, but Lowne's terminology will be adopted in the account that follows.

The genus *Stomoxys* includes a small group of biting flies, which resemble each other so closely that their distinction is an extremely difficult matter. It appears to be truly cosmopolitan, species or races being reported from all parts of the world. The type species may be taken as *Stomoxys calcitrans*, which is common in all parts of England, especially where horses are allowed to run wild, as in the New Forest, where it is locally known as the "forest horse-fly," and the pony owners have an erroneous idea that it is peculiar to the neighbourhood. It has been found also in Malta, North Africa, and Jamaica, and flies from the Indian Terai closely resemble it, as also does *St. enos* from New Zealand, and *St. vernon* from British Columbia. *St. occidentalis* from the United States, and *St. suggillatrix* from South America, are also closely similar.

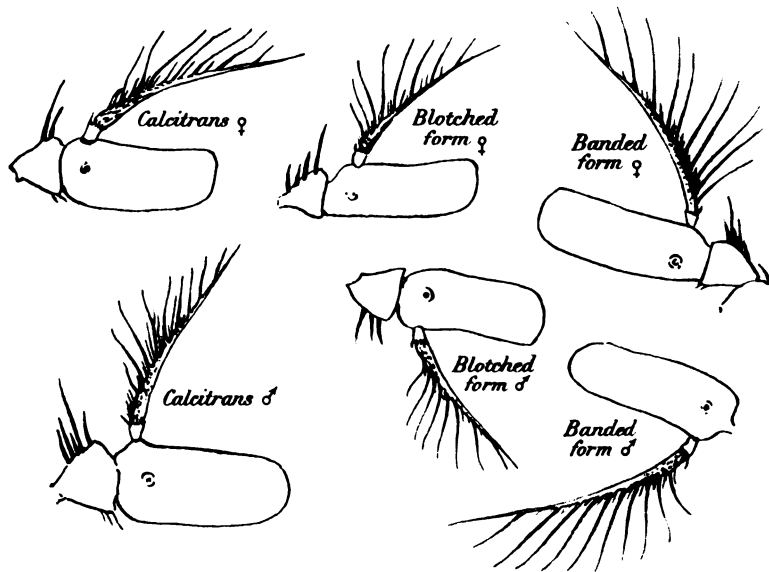
Curiously enough the flies brought by me from Kumassi, and collected together from a swarm that was tormenting the animals in the horse lines there, included two fairly distinguishable forms.

As Mr. Austen, of the British Museum, is shortly undertaking an examination of this genus, and careful

drawings are being prepared for the purpose, it was decided not to attempt to name these forms, but to speak of them for the present as the "blotched," and "banded" forms respectively. The former closely resembles *C. calcitrans*, while the latter is much like some specimens in the Museum derived from the island of Mauritius.

The accompanying rough figures give some idea of the markings of these various forms and of the closeness of their resemblance to each other, but does not pretend to close accuracy or proportional size, as any attempt to do so is clearly superfluous in view of the fact that the task is at present in the skilful hands of Signor Terzi.

I am inclined to think, however, that a means of distinction is to be found in the flagellum of the antenna or arista, as it is usually called by dipterologists. This structure is provided with a discrete fringe of long hairs, and I find that the number of these varies in the different forms, as well as sometimes in the sexes of the same species. Besides the long hairs, there are a number of shorter ones which may be spoken of as accessory hairs, and in *Stomoxys calcitrans* these are much longer than in either the "blotched" or "banded" forms.



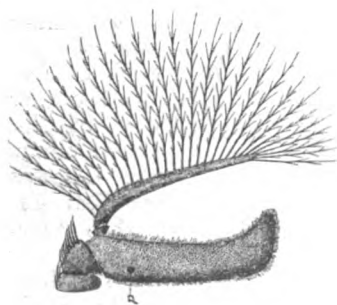
The above figures will illustrate my meaning better than much description.

The long main hairs spring more from the dorsal side of the arista, as it is usually carried by the insect, and so project almost directly upwards, while the accessory hairs are arranged along its inner side, and project inwards and upwards. In specimens mounted in balsam both ranks are forced more or less into the same plane, and are so represented in the figures. Besides the two principal ranks the proximal half or more of the arista is closely clothed with hairs, which in some cases are as long as those I have termed the accessory hairs, but neither these nor the extremely close dress of fine hairs that cover the antenna proper are represented in the camera

lucida drawings. The principal hairs are, it will be noted, simple.

A glance at the drawings shows that the three forms can be quite easily distinguished, and moreover, that the "banded" Kumassi *Stomoxys* resembles the English *St. calcitrans* more than the "blotched" form, which resembles the latter more closely in colouration. Both sexes in the "banded" insect have ten principal hairs, whereas in the blotched one there are but eight in each sex, and the entire arista is shorter proportionally to the last joint of the antenna. In both sexes on each of these forms the accessory hairs are quite short. *Stomoxys calcitrans* has seven principal hairs in the ♀ and nine in the ♂, and may be further distinguished from the banded form by the comparative smallness of the fork formed between the termination of the arista and the most distal principal hair. The accessory hairs are also very much longer than in either of the other forms, especially in the male, a further peculiarity of which is that the next but longest principal hair is provided with a small branch about half-way in its length. As far as observed these characters appear to be constant, but the series examined is not numerous enough to speak with certainty on this point. The remaining forms mentioned have not been examined, as they were British Museum specimens, and it is hardly possible to produce an accurate drawing for comparison without mutilating the specimen so as to be able to mount the antenna in balsam.

The antenna of *Glossina*, a drawing of which is reproduced from Mr. Austen's monograph, as will be seen, differs entirely in having compound principal hairs. Among the flies recently sent to the Museum is a *Stomoxys* from the Gambia, easily distinguishable by the brilliant white marking of the frons, and which answers fairly to the description of *St. sitiens* from Abyssinia.



Rondani's description is, however, too brief to admit of certain identification without comparison with his types. Besides this there is a form from Somaliland which much resembles my "banded form," in marking, and as far as can be made out in the armature of the arista, but is easily distinguished by the pinkish colour of the lighter markings on the frons. On the whole, however, it seems improbable that more than half-a-dozen forms will require to be distinguished.

The genus *Stomoxys* was founded in 1762 by Geoffroy "L'Hist. abrégée des Insectes," ii., p. 538), with the following definition: "*Antennæ patellatæ*

seta laterali pilosa, os rostro sululato simplici acuto, ocelli tres." He notes further its close superficial resemblance to the common fly, but remarks that "its more widely separated wings and its shorter abdomen give it a look that make it easily recognisable to close observation. In France it is commonest in autumn, and he points out that this probably is the origin of the old French saying, "les mouches d'automne pignoient." His figure is unmistakable.

A more modern definition is to be found in Schiner's "Fauna Austriaca," i., p. 577, but is no better suited to the requirements of modern classification, as it is so planned as to include *Hæmatobia*, which differs from *Stomoxys* in the easily recognisable character of having the palpi nearly as long as the proboscis, whereas in *Stomoxys* they are of quite insignificant dimensions.

The venation of the wing presents nothing very characteristic, and is so closely similar in the various forms that it is unlikely to be of much service for the distinction of species. Moreover, owing to the wing being far from flat it is difficult to so mount specimens as to obtain strictly comparable outlines for comparison.



Stomoxys, banded form, ♂. Venation of wing.

Just as in the case of the common house-fly, the tropical forms on *Stomoxys* are considerably smaller than the English insect. The two sexes resemble each other so closely that it is difficult without close examination to distinguish them from each other, especially as both males and females are equally blood-thirsty, and a gorged male often distends its abdomen to such an extent as to look much like a gravid female. The most prominent point of difference is that the space between the eyes is much wider in the females. Examined casually the abdomen differs but little in the two sexes, but a closer examination reveals the point that while that of the female ends in a papilla-like ovipositor, the hypopygium of the male is tucked under him in much the same way as that of the female crab. On closer examination the male genital apparatus proves to be of a very complicated character, and this, too, may prove of service in classification.

(To be continued.)

HYPNOTIC SUSCEPTIBILITY OF THE NEGRO RACE.

By C. W. BRANCH, M.B., C.M.Edin.
St. Vincent, B.W.I.

THERE being, as I believe, but little so far recorded of therapeutic hypnotism in negroes, the included figures may be of interest to those practising in

tropical climates, who will take the trouble to verify the utility of hypnotism.

I do not propose to give any results of therapeutic suggestion, but merely to indicate the psychological fact of the degree of susceptibility of the black race to hypnotism.

For the purpose of obtaining a percentage, notes were kept of a 100 consecutive persons of pure negro blood who were tried under various conditions favourable or otherwise to hypnotism. Of these it was found that 87 were influenced at the first sitting. Of the 13 who failed, two whom it was desirable to hypnotise were influenced at the second try. The other 11 were not tried again. Of these last one was a case of mania, one a child of feeble intelligence, and two very aged doting persons. All these four were not subjects who could be expected to be influenced.

The method employed was almost invariably simple persuasion to sleep, aided usually by stroking of the forehead, or, in a few cases, by fixation of the eyes by the finger or other object.

In two cases of mania fascination was resorted to, and failed with one. Passes were tried without success on the two cases of mania and on the imbecile child. In some instances persuasion addressed to several persons at once and indirect persuasion (of another person) have been used. The latter was unsuccessful on one occasion only, and that was with one of the dotards.

Unintentional hypnotism has occurred more than once, though none of those so influenced are included among the 100 cases.

Compared with the results among whites in Europe, where 80 to 84 per cent. are found susceptible after many tries, these figures show that the negro is distinctly more susceptible. It might be inferred that a more expert hypnotist would find the negroes susceptible to the extent of nearly 100 per cent.

So easily influenced do I find my black and coloured patients that at hypnotic clinics all the patients in the room were hypnotised simultaneously. Those who had previously attended fell asleep at the bare command, while new cases, by imitation and persuasion, were asleep in a minute or less. In this way ten persons have been operated upon at once, and there is probably no limit except that of accommodation.

It is probable, that given the attitude of expectancy, such as that of persons desiring medical treatment, a Liebault or Bernheim could hypnotise to sleep as many blacks as could hear and understand him, as readily as an expert prestidigitator hypnotises his entire audience into visual illusions and sometimes hallucinations.

The ages and sexes of the 100 cases referred to are shown in the table below :—

Age		Hypnotised		Not Influenced	
		M.	F.	M.	F.
3 to 14 years	...	7	7	0	1
14 „ 21 „	...	5	5	0	1
21 „ 60 „	...	14	31	1	5
Over 60 „	...	7	11	4	1
		—	—	—	—
		33	54	5	8
		—	—	—	—

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THE

Journal of Tropical Medicine

APRIL 2, 1906.

A TROPICAL MEDICAL ASSOCIATION.

HAS the time arrived when it is possible to found an association of medical men interested not only in Tropical Medicine, but in the position Tropical Medicine as a definite branch of General Medicine should take and aspire to? The question has been brought keenly home to me by the difficulty encountered on several occasions of obtaining permission to hold a Section of Tropical Diseases at the annual meetings of the British Medical Association. The Section of Tropical Diseases has on several occasions been omitted by the authorities to whom the allocations of sections at the annual meetings of the Association have been entrusted, and it was only by representation and persuasion that a tardy acquiescence to hold the sectional meeting was obtained.

This year, again, at the meeting at Toronto, a Section of Tropical Diseases is omitted ; and although the writer has represented the matter both to Canadian authorities and to the Council of the parent Association, nothing has come of it.

The reply on several occasions has been that Tropical Diseases might be considered under the auspices of or as a sub-section of the "Medicine" Section. Any one acquainted with the impossibility of dealing with all the papers sent to the Section of Tropical Diseases at the annual meetings, is aware that to include

Tropical Diseases in any other section or sections is calculated to prevent men interested in Tropical Diseases attending the meetings. Not only is it that there is no time for the papers to be read, but when a subject appertaining to tropical diseases is brought forward, the medical man who reads the paper or opens the discussion wishes to have the matter laid before experts, and before those interested directly in the disease or investigation he has undertaken. The Section of Tropical Diseases in connection with the annual meetings of the British Medical Association has been a pronounced success. The numbers attending the Section, even remembering the scattered constituency from which it is gathered, have frequently been larger than any other section of the annual meeting; and the importance and scientific value of the communications may surely, without prejudice or exaggeration, be stated to be of superlative importance.

From yet another point of view are the practitioners in the Tropics deserving of full recognition at the annual meetings. The number of medical men directly interested in Tropical Medicine amounts to some 6,000, and they form the largest section of qualified medical practitioners on the British Register whose interest is centred in any single subject. Of the 34,000 men on the register, some are interested in general medicine, some in surgery, others in gynaecology, obstetrics, skin, eye, throat, ear, nose, epidemiology, anatomy, physiology, pathology, nervous diseases, ambulance work, dentistry, or other sections provided at the annual meeting; but no single section can show so large a body of men on the British Register to whom one single section presents so singular an adhesion as that of Tropical Diseases.

The writer is led to believe that in expressing the above opinions, he is merely voicing those of most of the members of the large body of British practitioners interested in Tropical Medicine, for the need of some metropolitan rallying point for our numerous but scattered body is sufficiently obvious. Assuming such a society to be formed, it would of course be well to seek affiliation with the British Medical Association, as such a step would enable the association to make their voices heard in the councils of the parent society.

The writer desires, before proceeding further in the matter, to have the opinion of medical men to whom this question is one of importance. Many subjects of supreme consequence to the State and to the individual would be dealt with by such an association, and in time it ought to become one of the most important of the several departments of medicine, both scientifically and ethically.

The readers of this Journal who wish their names to appear on the General Committee of "A Tropical Medical Association," should send in their names, addressed to the writer at the office of this Journal, 89, Great Titchfield Street, Oxford Street, London, W. It is to be distinctly understood that the contemplated association is not a separate association, independent of the British Medical Association, but one intended to promote the interests of Tropical Medicine within the parent Association, and constituted so that the wishes of medical practitioners in the Tropics may be authoritatively and collectively expressed.

JAMES CANTLIE.

ANTI-MALARIAL SANITATION IN INDIA.

THE short "Editorial" which we reproduce below from the columns of the Indian *Pioneer* is a gratifying proof of progress in the education of public opinion in India on the subject of the possibilities of anti-malarial sanitation.

The facts, indeed, as therein quoted from Major Duke's report, are of a kind to convert the most sceptical, and we congratulate our influential lay contemporary on its altered attitude with respect to the question; for it is not so long ago that the *Pioneer* and the army of "common-sense" correspondents whose letters found a favourite home in its columns, found it hard to sufficiently express their contempt for those who believed it possible to sufficiently diminish the number of mosquitoes to effect a corresponding diminution in the sick list of malaria. The measures adopted by Major Duke, it will be noted, are in no way novel, but are simply those that have been recommended from the first by Major Ross and those who have associated themselves with him in the campaign. Now that the *Pioneer* has been converted, we may perhaps hope that the Indian Government may follow suit, and that perhaps in ten or twelve years or so we may hear of its undertaking general adequate measures for the protection of our troops in cantonments and of the civil population of our great Indian towns.

"The report of the Medical Officer in Baluchistan for the year 1904, though late in issue, contains at least one fact that is worth recording. In Baluchistan, malaria is 'at once the greatest primary cause of illness, and indirectly gives rise to a large proportion of the ill-health expressed in other terms.' To show what can be done by preventive measures Major Duke quotes the records of the Shahrigh Railway Hospital, which is largely attended by the civil population of the tahsil and bazaar and villages near. The average annual number of malarial cases treated between 1898 and 1900 was 2,827, and in 1900 there were 3,227 cases. The following year the number rose to 3,876 cases, and in 1902 special anti-malarial measures were enforced. Quinine was distributed, surface drainage and the kerosining of pools were adopted, and the malarial cases fell to 2,722. In 1903 these measures were continued, and in addition, the cultivation of rice within a mile of the tahsil was prohibited, and in that year the cases fell to 1,792. In 1904, with the continuance of these measures, there was a further fall to 957 cases. At the same time, in the dispensaries above and below Shahrigh, in the last-named year, there was in the one case a steady and in the other a great increase in malarial cases. Thus 1904 was evidently not a healthy year in the district, and there is no evidence of any exodus of population. The effectiveness of the anti-malarial campaign is thus clearly established."

Translation.

PRELIMINARY STATEMENT ON THE RESULTS OF A VOYAGE OF INVESTIGATION TO EAST AFRICA.

By R. KOCH.

(Translated from the German by P. Falcke.)

(Continued from page 76.)

(4) TSETSE-FLIES AND TRYPANOSOMA.

I HAVE met with four different species of the genus *Glossina* during my expeditions. These are *Glossina fusca*, *G. morsitans*, *G. pallidipes* and *G. tachinoides*.

In addition, *G. palpalis* has been found in the islands of Victoria Nyanza belonging to German territory by Dr. Feldmann, and probably also *G. longipennis*, which I caught during my journey by the Uganda Railway between Voi and Tsavo Stations, not far from the German frontier. Thus six out of the eight species of *Glossina* hitherto described occur in the German East Africa.

It has hitherto been taken for granted that *G. morsitans* is the carrier of tsetse disease. This species, however, is only found in certain tracts of the Protectorate, particularly in the north and south, between the great lakes; in the middle, its place is filled by *G. pallidipes*.

G. tachinoides, the smallest of the *Glossina*, appears to be widely distributed, but only appears in small numbers. On the other hand, I have encountered *G. fusca* in great numbers wherever tsetse disease is prevalent.

I was first successful in discovering specimens of *G. fusca* infected with trypanosomata, and in the following manner. On examining the flies under the microscope I noticed that the proboscis was always filled with a liquid which, by pressure on the bulb of the proboscis, could be squeezed out in the form of a clear droplet. As it might be presumed that the fly, in puncturing, injects this droplet under the skin of its victim, and that infected flies must have trypanosomes in this liquid, I examined the drops exuded from a number of specimens microscopically, and actually found numbers of trypanosomes in a few cases. The circumstance that the liquid was quite devoid of red blood cells, that the trypanosomes were much more numerous than they ever are in the blood, and that they exhibited various stages of development, led me at once to the conclusion that these flies do not transmit the disease direct by injecting the blood of a sick animal into a healthy one; but that conditions here are similar to those that exist in malaria parasites, *i.e.*, that the trypanosomata undergo a stage of development in *Glossina*. The correctness of this assumption was fully verified when the flies, whose probosci contained trypanosomes, were more minutely examined. Sections of the stomach, even when quite devoid of blood, contained large numbers of trypanosomes in different stages of development. They are either entirely absent from the intestine, or are only present in very small numbers. I have never been able to definitely establish the presence of trypanosomes in either the glandular organs, the Malpighian tubes or elsewhere than in the situations mentioned.

In all nearly sixty flies containing trypanosomes were examined, including one specimen each of *G. morsitans* and *G. pallidipes*.

It appears to me, therefore, a foregone conclusion that in German East Africa the tsetse disease is transmitted not only by *G. morsitans*, but also by *G. pallidipes*, and particularly by *G. fusca*, which quite coincides with my observations on the distribution of these species.

As far as I have made out, the cycle of development of the trypanosome in the *Glossina* is as follows: The trypanosomes ingested with the blood, the number of which, under natural conditions, is very limited,

soon multiply in the stomach by longitudinal division, and also increase in size. The degree of growth will be best seen by a comparison between fig. 15, which represents a trypanosome from the blood of an ox, and fig. 16, which shows a trypanosome from the stomach of an infected *Glossina*. Simultaneously a remarkable differentiation sets in.

Part of the large trypanosomes become thick and plump, with a rich blue-staining plasma, and exhibit a rather large, rounded chromatin body of loose consistency (fig. 16). Other portions of the parasites are exceedingly slender, and their plasma does not take the blue stain, but possess a long, thin, dense chromatin body (fig. 17). Sometimes one type predominates, sometimes the other, and in different parts of the same preparation close aggregations of each form may be met with.

(To be continued.)

Abstract.

THE PREVENTIVE TREATMENT OF DISEASES (Les Médications Préventives). By Dr. L. Nattan-Larrier. 1 vol. in 16. Baillière et Fils, Paris.

The history of preventive medicine commences with inoculation for small-pox and vaccination, but in 1880 the work of Pasteur and of Toussaint opened up a new field of research by demonstrating that the inoculation of a modified microbic culture might confer a specific immunity on animals. The principle of preventive bacterio-therapeutics has been definitely established since 1881. In 1885 Ferran published the good results which he had obtained by treating cases of Asiatic cholera by means of a vaccine derived from cultures of the comma bacillus; and although his statements were at first treated with much scepticism, they would appear to have been since confirmed by Haffkine's researches. The remarkable discoveries of Behring and Kitasato in 1890 of the antitoxic sera resulted in the serotherapeutics and seroprophylaxis of diphtheria and of tetanus. Since then the question has advanced with giant strides, and (as will be shown in this book) it is now possible by means of injections of serum or of modified cultures to arrest the development of diphtheria, plague, cholera, enteric fever, tetanus, and possibly also puerperal fever. Immunisation by serum is a *passive immunity*, whilst immunisation by modified cultures is an *active immunity*.

[For want of space I shall limit my remarks to those on Plague, Cholera, Enteric Fever, and Yellow Fever, as they apply more especially to warm climates. —J. E. N.]

PLAGUE.

Two specific methods have been proposed and employed to combat plague: one of these we owe to Yersin, namely, immunisation by anti-plague serum; the other, due to Haffkine, consists in the inoculation of cultures killed by heat. We will now consider each of these two methods.

I. *Preventive Serotherapeutics of Plague.* — The earliest researches of Yersin, Borrel, and Calmette

demonstrated the immunising power of the anti-plague serum. In January, 1897, Roux was able to state in the *Académie de Médecine*: "Hitherto the serum has only been tried in the case of confirmed disease. According to what has been observed in animals, it ought to be still more efficacious in the prevention of plague than in its cure. It would therefore appear necessary, when a case of plague has suddenly appeared in a house, for all persons who are exposed to contagion to be injected with serum as a preventive measure. Yersin thinks this is an efficacious measure against the diffusion of the disease." Cases of preventive serotherapy soon became numerous, the dose of the serum usually amounting to 10 cc., which, however, appeared to confer immunity for only fourteen days. It is therefore necessary to renew the preventive injection every twelve days in the case of individuals who remain in the epidemic focus; this necessity is the more imperative, as, although the morbidity is lessened, the mortality remains as high in the case of individuals whose immunity is exhausted as it is amongst those who never underwent any preventive injection. In consequence of the short duration of the immunity conferred by the serum, and of the need for the revaccination to be repeated several times a month, Simond and Yersin were of opinion that "sero-vaccination was not applicable in practice for an entire population, although an excellent method to be adopted in individual cases or in families."

II. *Inoculations by Sterilised Cultures.*—Haffkine's method seems on the whole to answer best for an extensive prophylaxis of plague, as it can be applied to a whole population; it has been largely used in India with the sanction of Government. The *rationale* consists in cultivating the *Bacillus pestis* in bouillon, under a layer of butter for a month, and then enclosing the culture in tubes, which are now sealed and heated for an hour at 72° C.; the culture enclosed in these tubes is then ready for inoculation purposes. The duration of the immunity conferred by injection varies from four to six months, and, in any, case, does not extend to the year, although Haffkine has noted some cases where it would appear to have been prolonged even up to two years; however, the general opinion in India is that immunity may be considered as exhausted at the end of three months, and therefore those individuals who reside in plague-stricken regions renew their inoculation every three months.

The French opinion, held by Calmette, Salimbeni, and Yersin, is that immunisation only commences by slow degrees, after a period in which vaccination favours the action of the plague bacillus. The British opinion is notably different, for it maintains that the period which elapses before the acquisition of immunity does not exceed twenty-four hours. The injection is somewhat painful, and although followed by general lassitude, frontal headache, a marked rise of temperature, &c., for a period varying from twelve to forty-eight hours, is not accompanied by serious results. The febrile reaction is the greatest objection raised against inoculation, and seriously militates against the wholesale vaccination of the population with Haffkine's plague-prophylactic fluid. The dose should not be less than 5 cc., and the operation is usually repeated in two or three weeks' time.

Conclusions arrived at.—Both methods of preventive treatment are efficacious.

The serotherapy, although more rapid and more certain in its action, only confers a transitory immunity, and therefore can only protect the individual from contagion by repeated inoculations, which is a difficult matter when one has to deal with the whole of the population; on the other hand, it is an excellent method for individual prophylaxis, such as in the case of the medical *personnel*, the employees of the sanitary services, or the families of the patients. Sero-vaccination, when combined with isolation and disinfection, holds high rank among the methods of defence against plague.

Major M. B. Bannerman ended his report in 1902 on the application of Haffkine's method with the following remarks: "The inoculation is absolutely innocuous: inoculations made during the period of incubation of plague in many cases exercise an abortive action on the disease. Inoculation confers immunity to a high degree; and if, in spite of the inoculation, an individual is attacked by plague, his chances of recovery are much greater."

Haffkine's method probably still requires to be perfected, but it already answers to a great extent to the desiderata of a preventive treatment applicable to a large number of individuals when an entire country is threatened with an invasion of an epidemic of plague.

CHOLERA.

In 1885 Ferran announced his method of vaccination against cholera, which reduced the mortality by exactly one-half. Since 1894 Haffkine's method has given even more remarkable results, although no official pressure was used, and only those individuals were vaccinated who freely consented to undergo this treatment. Haffkine's method consists of a double inoculation with an interval of five to eight days; the first injection at first consisted of cultures of the comma bacillus sterilised by the addition of carbolic acid, but this method has been replaced by the use of living cultures attenuated by heating up to 72° C.; the second injection is a culture of high and constant virulence obtained by a continuous series of "passages" of the bacillus through the peritoneum of guinea-pigs, the comma bacillus thus acquiring a virulence which is twenty times stronger than before. Immunity is exhausted after one year.

The symptoms of anti-choleraic vaccination consist in a localised œdema at the seat of injection, which is painful to the touch, accompanied a short rise of temperature, but no serious accident has ever been caused thereby. Wherever cholera has been sufficiently scattered and prevalent so as to lead one to suppose that the whole of the population has been equally exposed to infection, and wherever the mortality has been high, in every instance this mortality has been greatly reduced in the case of the inoculated. A preventive anti-choleraic serum has also been tried, but it has hitherto proved less useful than the vaccine in those regions in which cholera is endemic, but the question is not yet definitely settled.

ENTERIC FEVER.

I. *Serotherapy.*—Although the anti-typhoid serum of Professor Chantemesse possesses undeniable pre-

ventive properties, it has rarely been employed prophylactically, so we cannot yet ascertain to what extent preventive serotherapy will enter into practice.

II. *Wright's Vaccine*.—The vaccine employed by Wright to obtain immunity against typhoid fever is somewhat allied to Haffkine's vaccines; both consist of cultures sterilised by heat, but whilst the microbes are inoculated by Haffkine, Wright decants his cultures and only injects their toxins. The process of the preparation of the vaccine may be summed up thus: Culture of Eberth's bacillus for a fortnight in the drying-stove at 37° C., sterilisation at 65°, addition of one-half per cent. of lysol. The filtered liquid is used for inoculation; its degree of virulence is such that the inoculation of 5 cc. entails in twenty-four hours the death of a guinea-pig weighing 250 grammes.

The dose varies from $\frac{1}{2}$ to $\frac{3}{4}$ cc., this latter being the dose most suitable when an interval of several weeks must elapse between inoculation and exposure to infection, and when one cannot resort to inoculations in succession. On the other hand, when inoculation is practised in the very midst of the epidemic a weaker dose must be employed, and after an interval of one week a second injection must be given, but in a stronger dose. The inoculation may be given in the hypochondrium, or any other part where there is an abundance of loose connective tissue. The injection of a medium dose does not usually give rise to any well-marked symptoms, and the patient ought to return to duty in three days. When too strong a dose has been injected the general symptoms become more severe, but without causing immediate danger.

Immunity is produced more or less rapidly, according to the dose of vaccine employed; when a very feeble one has been given, immunisation may be produced in about twenty-five hours; for this reason, in epidemic centres a feeble dose should first be given, and this should be followed by a second one. The duration of immunity conferred by Wright's vaccine does not exceed one year, and may begin to decrease after six months.

Conclusions.—Wright's method, without entailing any danger for the inoculated individuals, seems to give very favourable results, viz., considerable diminution in the number of cases, and relative mildness of the enteric fever which may develop, in spite of the injection. The inoculation may be dangerous if the person is inoculated with too strong a dose whilst he is in the fever zone when the epidemic is at its height, as he is then more likely to contract the disease. Wright's vaccine is especially indicated in the case of troops employed in Colonial expeditions.

YELLOW FEVER.

The researches of Marchoux, Salimbeni and Simond, if still far from solving the question of preventive serotherapy and in yellow fever, nevertheless bring some important contributions to this question, as they have carefully ascertained the period during which the patient's serum contains the organism of the disease, and have sought to discover to what degree the blood of yellow fever patients might contain immunising substances. These researches on the preventive serotherapeutics of yellow fever were undertaken (a) by means of virulent blood, sterilised in various ways; (b) by means of serum from convalescents, this

serum no longer containing the agent of yellow fever, but being endowed with immunising properties.

(a) On the third day of the disease the blood of the yellow fever patient contains the pathogenic agent, an invisible microbe, capable of provoking yellow fever; the inoculation of $\frac{1}{10}$ cc. of serum is sufficient at this period to give yellow fever; but if heated up to 55° C., this serum becomes harmless, but still preserves its immunising properties.

(b) After the fourth day the blood of the patient is incapable of transmitting the disease; it was therefore thought that this sudden disappearance was accompanied by the presence of immunising bodies in the serum. The injection of serum from a convalescent patient may indeed confer immunity on a healthy subject; but this serum only retains this property during a period of twenty-six days, after which it can only confer partial immunity. However, these admirable results cannot as yet be considered as entirely confirmed, and their prophylactic measures, although of the highest importance, must still be considered as in the experimental stage only. J. E. NICHOLSON.

EXTRACTS FROM COLONEL GORGAS' MONTHLY REPORTS FROM THE CANAL ZONE, PANAMA.

By ISAAC BREWER, M.D.

TRYPANOSOMA IN RATS ON THE ISTHMUS OF PANAMA. DURING the month of November, 1905, Dr. Arthur I. Kendall, Acting Chief of the Board of Health Laboratory of the Canal Zone, examined 1,563 rats, and found 278 infected with *Trypanosoma lewisi*.

During the same period he examined 547 mice, in 39 of which he found trypanosomes.

MALARIAL PARASITES.

According to the monthly reports issued by Colonel Wm. C. Gorgas, Chief Sanitary Officer of the Isthmian Canal Commission, 1,942 blood examinations were made from September 1st to December 31st, 1905.

Malarial parasites were observed as follows:—

Single tertian	...	...	...	772
Double tertian	...	...	...	17
Æstivo-autumnal	...	...	...	764
Quartan	...	...	...	4
Mixed infections	...	...	...	78

PARASITES IN FÆCES.

The following results of 394 examinations of stools made by the Sanitary Department of the Isthmian Canal Commission during September, October, and December, 1905, are tabulated from the monthly reports issued by Colonel Wm. C. Gorgas, Chief Sanitary Officer of the Canal Zone:—

Ova of <i>Uncinaria duodenale</i>	...	...	101
Ova of <i>Tricocephalus dispar</i>	...	...	104
Ova of <i>Ascaris lumbricoides</i>	...	...	58
<i>Amoeba dysenteriae</i>	...	...	30
<i>Rhabdonema strongyloides</i>	...	...	21
<i>Cercomonas intestinalis</i>	...	...	19
<i>Balantidium coli</i>	...	...	2
<i>Myiasis</i>	...	...	2
<i>Trichina spiralis</i>	...	...	1
<i>Bacillus dysenteriae</i>	...	...	9
Negative	...	...	116

In 2,512 analyses of urine during the same period hæmoglobinuria was observed 13 times.

Review.

BLOOD-SUCKING FLIES AND HOW TO COLLECT THEM.
By E. E. Austen.

The British Museum have issued a second edition of this valuable pamphlet, which should be in the hands of every tropical practitioner.

Although in the main a reprint, a description of the *Leptide* has been added, as this family occasionally exhibits bloodthirsty habits. We should have liked, however, a figure of one of the alleged blood-sucking species, so as to know them when we see them.

Other notes, for example, on the Implication of Stomoxys in the transmission of Surra, have been added, which show how careful Mr. Austen is to keep the pamphlet up to date.

A further addition is a note by Lieut.-Col. Giles on the preservation of insects intended for histological examination.

The pamphlet is published at the nominal price of 3d., and Mr. Terzi's beautifully drawn and accurate figures are alone worth a great deal more than the small outlay; and the additions, though not extensive, are sufficient to make the acquisition of the new edition desirable.

We were somewhat surprised, therefore, when a copy of the old edition was tendered us on demanding one at the Catalogue counter of the Museum. We trust this was due to delay in furnishing the salesman, and not to a desire to "work off" the old stock. Such a petty economy would be much to be deprecated, as it might, for example, easily result in the museum losing specimens of the *Leptide* owing to the attention of collectors not being drawn to them.

Correspondence.

To the Editor of the JOURNAL OF TROPICAL MEDICINE.

DEAR SIR,—In a recent copy of the Journal Dr. Wellman referred, in his "Notes from Angola," to the treatment of so-called "malarial ulcers" by local applications of quinine.

May one enquire how the application is made? Is it the emulsion in cod liver oil that is used (see *Lancet* of 1902), or is there some fresh method of application?

Yours, &c.,
W. D. G.

Drugs and Remedies.

CYPROL—a distillation of Cypress oil—is commended as an excellent remedy in Whooping Cough. F. A. Rogers, 327, Oxford Street, London, supplies the pure concentrated oil—Cyprol, as well as an essence, a liniment, and pastilles prepared from the oil.

GASTRODYNIC—a compound enzyme palatinoid—a combination of Pancreatin Pepsin and Lactophosphate of Lime, prepared by Messrs. Oppenheimer, Son and Co., Limited, London, seems an effective remedy in dyspepsia. The ingredients are in equal quantities of one grain in each palatinoid, and one to three palatinoids may be given after meals in cases of ordinary dyspepsia.

XAXA—an acetyl-salicylic acid, issued by Messrs. Burroughs Wellcome and Co. in five-grain tabloids—appears to possess the therapeutic properties of salicylic acid and its salts without unpleasant after-effects.

For the relief of pain fifteen grains of "Xaxa" may be given at a single dose, with ten-grain doses repeated in one hour until three or four doses have been given.

Books and Papers Received.

WE have received "The Doctor's Handy Reference List" from Messrs. Pulman and Sons, 24-26, Thayer Street, Manchester Square, London. This is a useful compendium, and affords exact information concerning asylums, sanatoria, convalescent homes, nursing homes, &c.

Notes and News.

PLAGUE has broken out in Seistan, in Eastern Persia, the frontier province of that country towards India. The nature of the disease has been confirmed by bacteriological information, but it is said that the disease is not spreading. Captain Kelly, I.M.S., has been specially sent from Quetta to render assistance.

A splendid example of the warm affection that grows up between the people of India and their European medical officers is afforded by the munificent donation of 10,000 rupees (£670) which has been received by the Central Committee of the Countess of Dufferin's Fund from Brig.-Surg. J. Law, Indian Medical Service (retired). The interest on this sum, in accordance with the donor's desire, will be annually expended in the Central Provinces where he spent the greater portion of his service. Retired Indian medical officers are seldom too well off, especially if they have passed most of their time in the Central Provinces, which is one of the least prosperous parts of our Indian Empire. In point of fact, the proceeds of the private practice of the men stationed there are much on a par with Mr. Bob Sawyer's, which readers of "Pickwick" may remember might be "put into a wineglass and covered over with a gooseberry leaf." Viewed in comparison with the colossal donations to charity of financial magnates, the sum may not appear large to European eyes, but it probably represents far greater personal sacrifice. With such warm feelings existing between doctors and their Indian patients it is hardly wonderful that the native chiefs and wealthy civilians should view with strong resentment the petty-minded restrictions on private practice inflicted on the Service by the late Viceroy, Lord Curzon. As an old Sikh Sirdar remarked the other day anent this question: "It is very hard that a man should not be allowed to do what he likes with his own." There is no more libellous assertion than that the Indian is lacking in the virtue of gratitude, for their folk-lore and epic literature conclusively show that a generous recognition of benefits received is regarded by them as the first requisite of the heroic character.

"UNIFICATION."

A correspondent of the *British Medical Journal* of March 17th (S. G.) makes a number of thoroughly practical suggestions on the organisation of our Imperial medical services. While regarding "Scalpel's" remarks on "Surgery in the R.A.M.C.," in the same journal for December 25th, as quite uncalled for, there can be no disputing the assertion that efficiency, whether in surgery or hygiene, is largely a matter of practice, and that during peace time the work of the military surgeon is rather that of sanitary specialist than of an operative surgeon. Hence, could it be arranged, the plan of combining our military and colonial medical services, as advocated by "S. G.," could hardly fail to promote efficiency in each service, and would probably be popular with the best officers of both.

S. G. writes as follows:—

"SURGERY IN THE R.A.M.C."

"I have read 'Scalpel's' remarks on surgery in the R.A.M.C. in the *British Medical Journal* of December 23rd, 1905, p. 1682. There is no doubt that lack of opportunity is the great bar to efficiency in surgery among men of the R.A.M.C. As a remedy I would propose a dual medical service, one for India and one for home and the Colonies. I think the present dual service for India a mistake. I would do away with the R.A.M.C. there and make the I.M.S., increased in strength, responsible for the care of the army, British and native. The smaller civil surgeries and dispensaries I would hand over to assistant surgeons and hospital assistants. Here we would have a magnificent reserve for this class, sufficiently strong in numbers and thoroughly trained in professional work. In like manner I would make college appointments and the care of the large civil surgeries, the charges of gaols, &c., prizes for the officers. Here, again, we would have a magnificent reserve, capable of taking the field, fresh from the charge of hospital where as much surgery is done as in most of the large London hospitals. At present a young officer of the R.A.M.C. comes to India where everything is new to him. Tropical diseases present phases and symptoms which are strange and unknown to him. During his first year he is beginning to get a grasp of his new duties. During his second and third years he is perfecting himself in the knowledge of tropical surroundings and diseases, and by the time he has grasped them and thoroughly understands them back he goes to England, where, perforce, he forgets many of the valuable lessons acquired during his Indian tour. The question of attendance on the men of the various regiments, batteries, &c., to be transferred to the Home Establishment could be easily arranged for by handing these duties over to medical officers of this new service going on leave. This would also be an immense boon to them and save them the terrible expense of passages for themselves and families, which so often makes such inroads on their slender resources. The Home Medical Service I would run on much the same lines as the Indian, making the Colonial Medical Service its reserve and the colonies its training ground."

Although nominally civilians, many colonial surgeons, especially in the African colonies, see far more fighting than usually falls to the lot of an officer of the R.A.M.C., and it is unjust that they should be debarred from the honours and glories incidental to a military career. Moreover, the special sanitary training of the R.A.M.C. would be as valuable to the officer when acting as a colonial civil surgeon, as the increased experience in ordinary medical and surgical practice would be to him when serving in a military capacity. Most important of all, it is difficult to see how in any

other economical fashion a sufficient military medical reserve can be secured for our Colonies.

His remarks on India are equally to the point. Owing to linguistic difficulties, it is indispensable that all branches of public service of that dependency should join for continuous service, and the medical departments are the only branch in which this is not enforced. The officers of the Royal Engineers serving there, for example, "elect for continuous service in India," and it is only in the medical department that we find the extraordinary spectacle of two distinct sets of medical officers, one only of which is capable of serving with all corps of the army, while the other is quite unavailable for service with the native regiments that form three-fourths of our Indian army.

THE "SANITAS" COMPANY, LIMITED.

At the Annual General Meeting (28th in number) of the "Sanitas" Company, Limited, held at Locksley Street, Limehouse, London, E., on March 1st, Mr. C. T. Kingzett, F.I.C., F.C.S., presiding, the Chairman remarked upon the steady growth of "Sanitas" in public favour, and while it was still regarded, from an all-round point of view, as the standard disinfectant (being the only preparation which combined in itself all the properties that could be desired for sick-room and household applications), it was necessary for the Company to meet competition from all sides. Hence, as the result of long investigation in their laboratories, the Company was about to introduce a new disinfectant to be known as "Bactox," which would favourably compare with the strongest known bactericides hitherto available, having a guaranteed co-efficiency of from thirteen to forty, as compared with pure carbolic acid. It was described as a neutral non-corrosive, saponaceous preparation, and having regard to its great germicidal strength and price would be found cheaper in use and as strong as, or stronger, than any competing article on the market, and devoid of all objectionable qualities. They would, therefore, in future, be able to offer to the public and sanitary authorities the choice of the best disinfectant for household and sick-room purposes on the one hand, and the strongest germicide for rough disinfecting and surgical use on the other hand.

Personal Notes.

R.A.M.C.

THE following R.A.M.C. officers have been selected for increased pay: Lieutenant-Colonels Townsend from July 22nd, Woodhouse from August 26th, and Rowney from October 4th, 1905.

Colonel Leake, R.A.M.C., embarked on the *Sicilia*, on February 3rd, returning to India from sick leave.

Lieutenant Webb, R.A.M.C., remains at home on extended leave until August next.

Lieutenant-Colonel Reade, R.A.M.C., comes out on posting to the Secunderabad Division.

Lieutenant-Colonel J. B. Winter, R.A.M.C., on his arrival from England, will be attached to the Meerut Station Hospital for duty.

Colonel Trevor, R.A.M.C., is appointed Hon. Surgeon to the Viceroy, vice Colonel W. S. Pratt vacated.

INDIAN MEDICAL SERVICE.

Major L. Rogers, I.M.S., Officiating Professor of Pathology, Medical College, Calcutta, is allowed privilege leave for twenty-seven days, with effect from February 19th or subsequent date.

Captain J. M. D. Megaw, I.M.S., Officiating Resident Physician, Medical College Hospital, Calcutta, is appointed to act as Professor of Pathology in the Medical College, during the absence, on leave, of Major L. Rogers, I.M.S.

Captain H. B. Steen, I.M.S., Officiating Civil Surgeon, is placed on special duty at the Medical College, with effect from January 10th.

Captain C. F. Weinman, I.M.S., Officiating Civil Surgeon, is placed on special duty in connection with plague in Belear, from December 25th, 1905.

Captain H. M. Melhuish, I.M.S., whose services have been placed at the disposal of this Administration, is appointed to officiate as Superintendent, Central Jail, Jubbulpur, during the absence on leave of Captain F. D. Browne, I.M.S.

Captain V. E. H. Lindesay, I.M.S., is allowed privilege leave combined with leave out of India for thirteen months and twenty days, viz., privilege leave for one month and twenty days, and leave out of India on medical certificate for the remaining period, with effect from November 10th, 1905.

Major F. O'Rinealy, I.M.S., Officiating Civil Surgeon of Darjeeling, is confirmed in the appointment with effect from September 23rd, 1905, *vice* Major F. P. Maynard, I.M.S.

Captain R. L. Hagger, I.M.S., furlough for eight months.

Major A. E. Roberts, I.M.S., is confirmed as Secretary to the Director-General, I.M.S.

To be Major: Captain Herbert St. John Fraser.

Lieutenants to be Captains: William Samuel Jagoe Shaw, Charles Seymour Parker, Harold Holkar Broome, Frederick Norman White, Charles Gibbons Seymour, Davis Heron, Thomas Corrie Rutherford, Henry Crewe Keates, Leethem Reynolds, Ernest Charles Taylor, Richard Arthur Needham, Dwarko Prasad Goli, James Kirkwood, and Alfred Whitmore.

Home Department.—Colonel Macrae, I.M.S., is confirmed as Inspector-General, Civil Hospitals, Bengal, and Colonel King, I.M.S., as Inspector-General, Civil Hospitals, and Sanitary Commissioner, Burmah, both with effect from April 29th.

Major Lamont, I.M.S., Professor, Lahore Medical College, is granted furlough out of India from March 20th to June 30th next. **Captain G. E. Charles, I.M.S.,** officiates as Professor of Anatomy, Lahore Medical College, *vice* Major Lamont.

Captain W. M. Houston, I.M.S., to act as Personal Assistant to the Surgeon-General with the Government of Bombay. **Captain J. H. McDonald, I.M.S.,** on relief, to act as Presidency Surgeon, Second District, and Marine Surgeon and Superintendent, Lunatic Asylum, Colaba. **Dr. F. M. Gibson, Medical Officer,** attached to the Plague Research Laboratory, Parel, is granted three months' privilege leave combined with twenty-one months' furlough from the date of relief.

Privilege leave for two months and twenty-one days, in combination with furlough for eight months and nine days, is granted to **Captain F. D. Brown, I.M.S.,** Superintendent, Central Jail, Jubbulpur, with effect from the afternoon of February 14th.

India Office: Arrivals Reported in London.—**Captain J. W. F. Rait, I.M.S.,** B. **Major C. E. L. Gilbert, I.M.S.,** Major C. R. M. Green, I.M.S., B. **Lieutenant-Colonel R. J. Baker, I.M.S.,** **Captain F. D. Brown, I.M.S.,** **Captain R. L. Hagger, I.M.S.,** **Major R. H. Castor, I.M.S.**

Extensions of Leave.—**Captain D. C. Kemp, I.M.S.,** M., special and study leave commuted to furlough on Med. Cert. for one year. **Captain H. B. Meakin, 6 m. Med. Cert., R.A.M.C.,** Major H. Austen-Smith, I.M.S., B., was on study leave from October 9th, 1905, to February 9th, 1906. **Captain E. L. Perry, I.M.S.,** B., was on study leave from September 1st, 1905, to December 31st, 1905, 4 m., M.C. **Lieutenant-Colonel J. Maitland, I.M.S.,** 6 m., M.C., the period beyond 3 m. and 17 days being extraordinary leave.

UNCOVENANTED MEDICAL DEPARTMENT.

Mr. S. Higginbottom to be Superintendent of the Government Leper Asylum at Naini in the Allahabad District.

COLONIAL MEDICAL SERVICE.

LEHFELDT.—**R. H. Leffeldt, D.Sc.Lond., B.A.Camb.,** Professor of Physics in the Transvaal Technical Institute, Johannesburg.

GIBBS.—**H. J. Gibbs, L.R.C.P., M.R.C.S., M.P.C.,** Resident Surgeon to the Tan Toeh Sing's Hospital, Singapore.

SINGER.—**C. Singer, M.B., B.C.Camb.,** Resident Medical Officer to the Government General Hospital, Penang.

DOMESTIC.

BIRTHS.

GRAVES.—At Kamptee, C.P., on February 24th, 1906, the wife of Major D. H. Graves, I.M.S., of a son.

MARRIAGES.

A marriage has been arranged between **Captain Cecil Maddock, Indian Medical Service, 43rd Erinpura Regiment, son of the late Canon Maddock, M.A., Fellow of Clare College, Cambridge, and Alice Edome, daughter of the late Rev. T. J. Monson, M.A., and the Hon. Mrs. Monson, of Ashlyn, Leighton Buzzard.**

A wedding took place at Dehra Dunn on February 5th between **Captain George Hutcheson, Indian Medical Service, eldest son of Colonel Hutcheson, Indian Medical Service, retired, and Miss Lilian Annette Reynolds, youngest daughter of Mr. and Mrs. Reynolds, of Chandbagh, Dehra Dunn.**

CLARKE—ADAMS.—At St. George's Church, Agra, on February 15th, 1906, by the Rev. W. Kitching, M.A., Chaplain of Agra, **Captain J. B. Clarke, Royal Army Medical Corps, to Violet Grace Seymour Adams, M.B., C.M. (Edin.).**

BURKE—REID.—At Christ Church, Rawal Pindi, on Wednesday, February 21st, 1906, by the Rev. H. A. C. Herbert, **Captain Bernard Bruce Burke, R.A.M.C., to Anne, younger daughter of Surgeon-General A. Scott Reid, C.B., I.M.S., Principal Medical Officer, Northern Command.**

CAMERON—ROBINSON.—At the Cathedral, Bombay, on Friday, February 16th, 1906, **Alexander Cameron, M.B.(Lon.), Indian Medical Service, second son of Alexander Cameron, M.D., of Cleethorpes, Lincolnshire, to Charlotte Eccles Mostyn, third daughter of the late Arthur Robinson, Esq., of Kemp Town, Brighton, and of Mrs. Robinson, Olton, Warwickshire. (Indian papers, please copy.)**

SOUTHON—YOUNG.—At St. Thomas's Cathedral, Bombay, on February 16th, 1906, by the Rev. Harold Foote, **Captain Charles E. Southon, I.M.S., 57th (Rifles, F.F. Peshawar, to Agnes McLeod, younger daughter of John H. S. Young, Esq., Edinburgh.**

LIST OF INDIAN MEDICAL OFFICERS IN MILITARY EMPLOY ON FURLOUGH.

Showing the Name, Regiment, or Department, and the Period for which the Leave was granted.

Armstrong, Lieutenant-Colonel H., I.M.S., 8 m., September 30th, 1905.

Babington, Lieutenant J. W. H., I.M.S., 9 m., fr. September 27th, 1905.

Browne, Lieutenant H. H., I.M.S., 1 y., fr. March 17th, 1905.

Clarkson, Major F. C., I.M.S.

Donovan, Major C., I.M.S.

Eyre, Lieutenant-Colonel, M.S., I.M.S., 1 y., fr. September 23rd, 1905.

Fayrer, Captain J. D. S., I.M.S.

Fooks, Major H., I.M.S., 18 m., fr. March 28th, 1905.

Fry, Captain A. B., I.M.S., 1 y., fr. October 26th, 1905.

Gilbert, Major C. E. L., I.M.S.

Hamilton, Captain W. G., I.M.S., 1 yr., fr. October 5th, 1905.

Hirsch, Lieutenant L., I.M.S., 15 m., fr. March 21st, 1905.

Hodgson, Lieutenant E. C., I.M.S.

James, Captain S. P., I.M.S.

Kirkpatrick, Captain H., I.M.S.

Lapsley, Captain W., I.M.S., 22 m. 1 d., fr. September 25th, 1905.

Lindesay, Captain V. E. H., I.M.S.

Lister, Captain A. E. J., I.M.S., 16 m., fr. February 12th, 1905.

Lumsden, Major J. S. S., I.M.S.

MacKelvie, Captain M., I.M.S.

Maddock, Captain E. C. G., I.M.S.

Mason, Captain W. G., I.S.M.D.

Meakin, Captain H. B., I.M.S., 18 m., fr. March 23rd, 1905.

Miller, Captain A., I.M.S.

Orr, Major W. H., I.M.S.

Parker, Lieutenant C. S., I.M.S., 1 y., fr. August 28th, 1905.

Perry, Captain E. L., I.M.S., 33rd Punjaub.

Pinchard, Captain M. B., I.M.S., 1 y., fr. August 12th, 1905.

Rait, Captain J. W. F., I.M.S.

Rodgers, Lieutenant-Colonel J. W., I.M.S., 52nd Sikhs.

Rundall, Lieutenant L., I.M.S., 24 m., fr. September 17th, 1904.

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THOMAS EDMONSTON CHARLES, M.D., LL.D. Edin., F.R.C.P. Lond.

Russell, Major A. R. P., I.M.S.
 Shore, Lieutenant-Colonel R., I.M.S.
 Steel, Lieutenant R. F., I.M.S.
 Stephen, Captain L. P., I.M.S., 1 yr., fr. June 24th, 1905.
 Swaine, Lieutenant-Colonel C. L., I.M.S.
 Sweeney, Lieutenant-Colonel T. H., I.M.S.
 Tate, Captain G., I.M.S., 1 yr., fr. October 3rd, 1905.
 Waddell, Lieutenant-Colonel L. A., C.B., C.I.E., I.M.S., 24 m.,
 fr. October 21st, 1904.
 Willcocks, Captain R. D., I.M.S., 13 m., fr. May 27th, 1905.

PLAGUE.

PREVALENCE OF THE DISEASE.

		Cases.	Deaths.
India.—Week ended	Feb. 17th	8,926	7,362
"	" 24th	9,420	8,312
"	March 3rd	10,580	8,770
S. Africa.—Week ended	Feb. 17th	0	0
"	" 24th	0	0
Hong Kong.—Week ended	Mar. 3rd	8	7
"	" 10th	15	16
"	" 17th	7	7
"	" 24th	15	15
Mauritius.—Feb. 11th to Mar. 17th		0	0
Week ended	" 24th	2	0
Japan (Formosa).—Jan. 1st to 31st		48	38
Brazil (Pernambuco).—			
January 24th to 31st	...	1	0
Peru.—January 21st to 31st	...	21	10

OBITUARY NOTICE.

THOMAS EDMONSTON CHARLES, M.D., LL.D. Edin.,
 F.R.C.P. Lond., Honorary Physician to the
 King; Surgeon-General, I.M.S.

It is with sincere regret, which will be shared as a personal sorrow by many of our readers, that we have to record the death of Dr. T. Edmonston Charles, at Flushing, near Falmouth, at the none too ripe age of seventy-two.

Dr. Charles was the son of a clergyman of the Established Church of Scotland, and was born in Calcutta in 1834, but in accordance with the usual custom, was at an early age sent home for education.

Electing the medical profession as his future career, he entered the University of Edinburgh, and graduated as M.D. and L.R.C.S. in 1855. His early connection with India naturally led to his deciding to follow his father's footsteps to the "land of regrets," and accordingly in the following year he joined the medical service of the Hon. East India Company.

The young medical recruit's admission to the service came just before the most exciting period of Anglo-Indian history, and before he had been a year in the service he found himself in the thick of the desperate struggle for existence that occupied the years 1857 to 1859.

His old friend and brother officer, Sir Joseph Fayrer, who contributes to the *British Medical Journal* a long and sympathetic notice, gives the following abstract of his services:—

"Soon after arrival he was attached to the 1st Bengal Fusiliers, served with them during the

campaign of 1857-8, and took part in the celebrated march from Dugshai to Umballa. He was in medical charge of 400 men of that regiment and two squadrons of H.M. 9th Lancers, forming the advanced brigade of the army; was present with the regiment at the battle of Badlee ka Sarai on June 8th, 1857, and throughout the entire siege of Delhi till its final capture on September 20th. He accompanied the column under Brigadier J. G. Gerrard, C.B., into the Rewaree District against the Jeypore and Jodhpore rebels, and was with Sir Thomas Seaton, K.C.B., during his operations in the Doab; was present at the action of Gungeyree, the battles of Ruttialee and the affair at Mynpoorie. He was with the army on its second advance on Lucknow under Lord Clyde, and was with the storming party of the 1st Bengal Fusiliers, who took the enemy's first position at the Chuker Kotee and other points in their line of defence. He was present throughout the rest of the siege of Lucknow, and subsequently with the column under Sir Hope Grant, K.C.B., in Oude. He was mentioned in the despatch of Major Hume of September, 1859, and received the Indian medal, and clasps for Delhi and Lucknow. He was appointed Garrison Assistant Surgeon, Allahabad, 1859, Officiating Garrison Surgeon in 1859, and First Assistant to the General Hospital, 1860. Soon after this Charles returned to Calcutta and joined the General Hospital, where he held an important post. On the retirement of Dr. Wilson, of the Medical College of Bengal, from the post of Professor of Midwifery and Obstetric Physician, Charles was appointed in his place. He continued to perform the duties of this office for many years with great success and with much benefit to the cause of medical education in India. Not only as an obstetric but as a general physician Dr. Charles met with great success, and obtained a large practice in the Presidency. The trying and responsible duties of this work in an Indian climate in time produced their natural results, and rendered it necessary for him to resign, in 1880, an appointment which had been to him the source of much professional repute and its consequent advantages."

One of his last services to India was the foundation of the Eden Hospital, Calcutta, which has since become one of the most important gynaecological institutions of the empire.

Retirement to Dr. Charles, however, by no means implied a cessation of work, which, indeed, in a man of less indomitable energy would probably have resulted in downright illness, but was simply a transfer of his labours to more favourable climatic conditions. He settled first at Cannes and afterwards at Rome, and was busily engaged in practice in each of these favourite resorts. With all this he found time to show himself a learned archæologist and an enthusiastic mountain climber. After twenty-two years' more work in these fields of activity, finding, as most men must at an earlier age, that a man of sixty-eight can scarce expect to be able to work as hard as younger men, he decided to retire to the mild climate of Falmouth, where he remained until the end of an exceptionally strenuous life. In Flushing, close by the old Cornish town, he found a charming resting place, an old Georgian villa, with a sunny garden running down to the beautiful estuary of the Penryn river,

where his trim 3-tonner lay moored. Here the veteran might often be seen amongst his roses or busied in demonstrating the marvellous mildness of the climate by cultivating tropical plants in the open. With such surroundings it was characteristic that he should become a keen yachtsman, and winter or summer, blow high, blow low, scarce a day passed without his passing several hours afloat. Besides this he showed active interest in the local medical and scientific institutions, and but a few days before his death was asked to permit himself to be elected as President of the South-western Branch of the British Medical Association. His contributions to medical literature were numerous and valuable, notably his revision of the Sydenham Society's translation of Marchiafava, and Bignami's work on malaria.

To such of us of a younger generation who enjoyed the pleasure of his personal friendship, nothing could be more stimulating than the example and conversation of one who, in spite of failing physical strength, showed himself to the last conversant with the latest developments of tropical medicine. Like most truly lovable men, Dr. Charles could be a sturdy fighter when he chose, especially when his strong sense of right and justice was aroused in the interests of others, and perhaps his last contribution to medical literature was his able statement of the facts of the unfortunate dispute as to priority between Prof. Grassi and Major Ronald Ross. So conclusive was his handling of the question that it practically secured the verdict of scientific Europe in Ross' favour, and the controversy practically died a natural death from the date of its issue.

Dr. Charles had been failing in physical strength for some time, but the end came rather suddenly. During the last few months he had had several short attacks of fever, possibly recrudescences of malaria, and these left him very anæmic. Still, when his old comrade, Sir Joseph Fayrer, visited him he could find no signs of organic disease, and there is no doubt that Dr. Charles' pathetic diagnosis of his own case was quite correct: "I am quite well, only the machinery is worn out." It is consolatory to know that his last days were marked by but little suffering, and that his end was such as must be desired by all men of science: to retain intellectual activity to the last, and to pass away simply because the physical organism had not rusted but worn out.

Through the kindness of Mrs. Charles we are enabled to present our readers with a striking portrait of this veteran tropical physician, who was, we know, the personal friend of so many of our readers.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Annales de l'Institut Pasteur," 1905, p. 715.

Schneider, L. E., and Buffard, M., after examination of affected animals on both continents, state that the trypanosomiasis of horses and donkeys in Algeria is identical with the "dourine" met with in various countries of Europe.

"Zeltschr. f. Hyg.," T. II., 1905.

YELLOW FEVER IN BRAZIL.

Otto, M., and Neumann, R. O. There is comparatively little new in this memoir, which contains the usual descriptions of *Stegomyia*, &c., with some excellent plates. They succeeded in carrying some of these mosquitoes to Hamburg, and breeding them in a hothouse through a certain number of generations. They find that eggs kept dry on filtering paper lose their vitality comparatively quickly if the temperature of the air is high, but survive some time if it be cooler. However, they do not think that there is any danger of their breeding on board ship even in the case of wooden vessels, as bilge water is too salt for the larvæ to live in. They also conducted some experiments to ascertain the possibility of infected mosquitoes being carried about in luggage, and come to the conclusion that there is little or no danger of such an occurrence. They did not succeed in discovering any new specific organism, and, like many others, quite failed in their attempts to cultivate the *Bacillus icteroides*, nor did they have any better fortune in experimenting with the 4 μ bacillus of Durham and Myers.

"Journal American Medical Association," February 3, 1906.

TREATMENT OF CHOLERA.

Ussher, C. D., acting upon Koch's suggestion that quinine should be tried in the treatment of cholera, has met with marked success in the outbreak of cholera in the Philippines; as many as 90 per cent. of the patients recovering. The plan of treatment was as follows: Sulphate of quinine ten grains every hour until the rice-water stools disappeared, and bile is passed in the motions. For suppression of urine, friction of the limbs, hot fomentations, dry cupping over the loins, and sweet spirits of nitre are useful. When evidences of the circulation failing supervened, subcutaneous saline injections prove beneficial. The sulpho-carbolates of zinc, lime, and soda in equal quantities, given at intervals of from two to four hours, are efficient when irritability of the bowel persists, with a foul odour of the evacuations.

"Revue Suisse de Zoologie," 1905, p. 415.

SOME TAPEWORMS OF THE CHIMPANZEE.

Bourquin, J. As the anthropoid apes have been found useful in experiments in connection with the investigation of sleeping sickness, the above reference may be of interest to those engaged in the investigation of that disease.

"Vierteljahrsschrift der Naturforschenden Gesellschaft Zurich," 1905, p. 163.

MIGRATION OF TRICHINA EMBRYOS.

Stäubli, C., who is in agreement with the previous observations of Akanazy, traces the embryos from the gut into the lymph channels and so to the thoracic duct, whence they are carried into the blood-vessels, and so to the muscles, where they become encysted. Naturally, the most active muscles being most vascular, arrest a disproportionate share of the intruders.

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

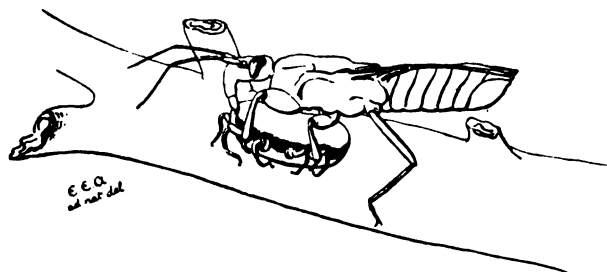
AN INSECT ENEMY OF THE DISSEMINATOR OF HUMAN TICK FEVER IN ANGOLA.

By ERNEST E. AUSTEN.

Zoological Department, British Museum (Natural History).

AMONG a consignment of blood-sucking and other insects received in August last from Benguela, Angola, and forwarded by Dr. F. Creighton Wellman, is a specimen concerning which the sender wrote as follows: "I found this insect on June 22nd, 1905, while studying a tick, *Ornithodoros moubata*, Murray, specimens of which I sent you some time ago. It was running about on the sticks composing a pig-sty, where I was collecting ticks. My attention was attracted by its singular appearance and movements; suddenly it entered a large crack in a stick, where it remained for some seconds. Since I could not clearly see what it was doing, I had the stick split open, when I found the insect holding a tick with its four anterior legs (which you will see are provided with curious paddle-like structures evidently designed for this purpose) and sucking blood from it by means of its powerful piercing proboscis, which it had inserted deeply into the tick. The animal was so intent upon its prey that I was able to carry it to a house without disturbing it, and to observe its actions for some time. I also exhibited it in the act of sucking blood from the tick to Mr. W. E. Fay, B.A., a former student at the London School of Tropical Medicine. When placed in a killing bottle the insect withdrew its proboscis from the tick, but still clutched it with its first two pairs of legs. I mounted it in this position, and you will notice the wound in the tick near the margin of its body."

The specimen referred to in the foregoing interesting note by Dr. Wellman is a hemipterous insect, or bug, belonging to the family *Reduviidae*, and to the species known as *Phonergates bicoloripes*, Stål. It is still grasping its victim in the manner described above, but the tick has become shrivelled and distorted in consequence of drying. The subjoined sketch will, however, perhaps make the position of the destroyer and its prey, as well as the general appearance of the former, sufficiently clear.



Phonergates bicoloripes, Stål, preying on *Ornithodoros moubata*, Murray.

The following is a brief description of Dr. Wellman's specimen of *Phonergates bicoloripes*, a species which was originally described from "Caffraria," and of

which the Museum collection includes three examples from the Zoutpansberg district of the Transvaal. Length, 18½ mm.; width of thorax at base of wings, 5½ mm.; width of abdomen (on which, when insect is at rest or walking, the wings lie closed one over the other like the blades of a pair of scissors) 5 mm. Colour: thorax metallic purple; wings (which when closed conceal abdomen when insect is viewed from above) deep velvet-black; hind-legs bluish-black; front and middle femora and front tibiae coral-red, with tips of femora, and base and tip of front tibiae, black; middle tibiae, brownish. The front and, to a lesser extent, the middle femora are swollen. The tips of the front and middle tibiae are provided on the underside with a large spongy pad, which assists the insect in obtaining a firm grip of its prey.

The bugs of the family *Reduviidae* prey, as a rule, upon insects of all kinds, and the writer is informed by Mr. W. L. Distant that he has even seen a specimen preying upon a weevil, i.e., a beetle belonging to the family *Curculionidae*, the intense hardness of the chitinous covering of which is well known. It is, of course, possible that by this time Dr. Wellman has met with other instances of *Phonergates bicoloripes* attacking *Ornithodoros moubata*, but it is extremely unlikely that the bug preys especially upon the tick in question. In all probability the specimen observed by Dr. Wellman happened to alight close to a tick, and seeing the latter crawling at once pounced upon it.

SUGGESTIONS FOR THE MAINTENANCE OF HEALTH BY WOMEN IN THE MISSION FIELD.¹

By MARY A. D. SCHARLIEB, M.D.Lond., B.S.

THE subject can be considered under the following heads:—

- (1) *Preparation for Work in the Mission Field.*
 - (a) A good rest and general "getting fit."
 - (b) Examination and care of teeth, eyes, skin.
 - (c) Medical examination and advice.

Special examination of intending wives.

- (2) *Selection of Candidates.*

Reasons for declining offers—age, disease, defects, deformities, nerves, bad family history.

- (3) *Allocation of Candidates to Special Work.*

- (4) *Care of Health on Active Duty.*

- (a) Clothes, food, drink, purification of water.

- (b) Choice and construction of houses; selection of site.

- (c) Amount of work, exercise, and rest.

- (d) Care of minor ailments—chills, slight fever, diarrhoea, toothache.

- (e) Dangers of mosquitoes, flies and ticks.

- (f) Annual holiday.

- (g) Daily dose of quinine.

- (5) *Care of Health when on Furlough.*

- (a) Medical examination and advice on arrival.

- (b) Choice of locality for holiday.

¹ Paper read at the Medical Officers of Missionary Societies Meeting, March 20, 1906.

(c) No deputation work on short furlough, and none on long leave until health is re-established.

(d) Medical examination some months before expiration of leave.

The maintenance of health in the Tropics depends greatly on

(1) THE PREPARATION FOR WORK.

Among the essentials of this preparation are the enjoyment of a good rest and the careful getting of body and mind into their best possible condition.

Many young women who offer themselves as candidates for mission work have already been considerably strained by other work or study. Many of them are teachers or medical students, some of them clerks, accountants, or domestic servants. In all such cases it is essential that an interval of several months should intervene between the old work and the new. If this precaution is neglected, the candidate may go out at the expense of the society, only to cause disappointment by an early breakdown.

It may be suggested that each society's medical adviser should enquire into the candidate's recent circumstances, work, and method of life. This would lead to advice about a holiday and where to take it. It must be remembered that many candidates have poor homes in crowded cities, and that a holiday spent in hard work in such surroundings is certainly not a "holiday" as intended by a medical officer or an advisory board.

It may be considered Utopian, but really each society should have its "home of rest," to which it could send its candidates and missionaries when necessary. This might possibly be arranged in connection with the hostel or training college which many of them already possess.

Medical Examination.—Of course each society has its medical officer, and several of them have advisory boards which have been the means of greatly lessening the death-rate of such missions as the Universities' Mission to Central Africa, and others working in specially unhealthy climates.

Many applicants for missionary service are overstrained from study and other causes and hence a preparatory term of rest is very essential to prepare them for the strain of tropical research.

Many of the great missions publish information as to the preservation of health in the form of a printed letter or pamphlet, but it is perhaps desirable that in each number of the missionary magazines there should be a short paper dealing with some practical point, such as the influence on health of mosquitoes, of excessive rainfall, imperfect protection from the sun, errors in diet, clothing and housing. No doubt the magazines are intended to arouse interest in the work of the mission, but they are so much read by the missionaries themselves that they would be good channels for the diffusion of information on such important subjects.

It also seems as if the committees of our societies need to be begged to consider more carefully the reports of their medical officers, and to give effect to their recommendations in the selection of candidates. They should also consider their advice as to the correction of certain defects, especially those of the eyes

and teeth, and as to the necessity for vaccination in all cases, and of inoculation with typhoid or plague in some special instances.

In the case of young women proposing to go out as the wives of missionaries, there should be a special investigation as to their fitness for maternity. The external measurements of the pelvis should be carefully taken with calipers, and, if any obvious deformity exists, a further examination under anaesthesia may sometimes be proposed: loss of valuable lives and much hindrance to work being saved if it is clearly understood that in any given case the wife of a missionary is likely to need specially skilled assistance, and must therefore go for confinement to some centre where such assistance can be secured.

(2) SELECTION OF CANDIDATES.

In the selection of candidates the medical officers of missions are greatly assisted by the excellent tables of questions supplied by most missions, unfortunately not by all. These questions should be as minute and searching as are those proposed by life insurance societies. This precaution is the more imperative because candidates, in their zeal for service, sometimes, it may be unconsciously, give a most misleading account of their health and physical capacities.

There are certain facts in a candidate's history which must lead to rejection, while a still larger number make it necessary to give her acceptance only in the event of her fulfilling certain conditions. Among the former are unsuitability of age. Candidates who are too young and immature are a constant care to the older members of the mission, and they are specially liable to certain forms of illness. Candidates much above 30 years of age are generally unsuitable, because they fail to adapt themselves easily to trying climatic and social conditions; they have become more or less set in their habits of life, and do not readily alter them, as is really necessary in the different conditions of climate and surroundings.

The older candidates, as a rule, find more difficulty in learning new languages, and are less fitted to understand the philosophy and religion of those to whom they are sent. Judgment may be better in middle life than in youth, but memory, power to learn, adaptability, and readiness of sympathy are less. Besides all this, there is a constantly increasing chance that organic disease or chronic error of function may be present, rendering the individual less able to withstand the evil influences of bad climate and poor food.

Another point to be carefully considered is the existence of some defect which is likely to impair usefulness, such as lameness, lateral curvature of the spine, flat feet, and any marked deformity.

Amongst the causes of conditional acceptance which may be noted are certain defects which impair usefulness, chiefly those of the special senses, such as deafness and errors of refraction. Deafness in even a minor degree makes the acquirement of a new language difficult, and defective eyes are unduly tried by unfamiliar symbols of language. To all this must be added the fact that when general vigour diminishes under the influences of bad climate, inadequate or unsuitable food, and trying work, all special dis-

abilities become more evident, and lead to breakdown just as surely as do constitutional unsoundness or attacks of illness. Probably people who have sharp hearing and normal sight are quite unconscious of their advantages in the battle, and do not know how much more difficult things are for less favoured colleagues. Unless, therefore, such defects can be remedied, the candidate should be rejected in justice both to herself and to the society.

The undesirable possession of "nerves," or the being, what people call, with unfortunately a certain degree of approbation, "very sensitive and highly strung," is generally a bar to effective and enduring work, whether in community or as an isolated missionary. It is a very serious question as to how far the prolonged and heavy burden of modern education is responsible for this condition. This is not the place to discuss the distribution of responsibility among mental training, the unconscious education of home, and real hereditary peculiarities, but no matter how produced, such a condition of the nervous system is a very real hindrance to work, whether at home or abroad, and should be regarded as being sufficient to debar a candidate from acceptance.

In the same category must be put bad family history, especially if that family history be a nervous one. No doubt the different parts of the mission field have different characteristics, and there are certain portions of it that are specially trying to the nervous system, *e.g.*, Japan, North China, and Burmah. This leads on to the next subject—

(3) ALLOCATION OF CANDIDATES TO SPECIAL WORK.

No doubt in many instances a candidate offers for some special work, and wishes, for instance, to be sent to Japan; but surely an essential part of the duties of the medical advisers to the societies is to consider the fitness of the candidate not only with reference to mission work in general, but for that special branch which she is anxious to undertake. To send a girl of obviously unstable nervous constitution to Japan would appear to be as wrong as to send another who has already suffered from malarial infection to the West Coast of Africa. All tropical climates have certain drawbacks in common, such as heat, undue moisture, presence of mosquitoes and other undesirable insects, but in addition there are peculiarities in nearly all these climates, and in advising societies as to the allocation of missionaries, it is desirable that the medical officers should know all that is possible for them to know as to these peculiarities, and also that they should study each individual case with a view to distributing the material as suitably as possible.

(4) CARE OF HEALTH ON ACTIVE DUTY.

There is a very regrettable waste both of life and health which is not really unavoidable. The climate in which the worker finds herself may be far from ideal, but in too many instances the missionaries, especially the younger missionaries, appear to absolutely court disaster. They remind one so much of the fatal remark made by Lord Methuen at the commencement of the South African War; he said: "This is a war in which it will not be etiquette to take

cover"; there spoke no doubt the courageous and gallant commander, but not the wise and successful leader of men.

Probably all doctors who have seen much of young women missionaries in the Tropics have found in them an heroic disregard of the most obvious precautions which ought to be taken as a matter of duty and common-sense by all residents in tropical climates. Some of this recklessness may be due to fiery zeal, beautiful and impressive, but not useful, which is more or less inherent in young people, but much of it is also due to the appalling ignorance of sanitation, hygiene, and physiology, so common in the present day. "The people is destroyed for lack of knowledge, how shall they know unless they be taught," and who is there to teach them. In our schools, whether for rich or poor, everything is taught, from the alphabet to the piano with the exception of what really concerns the pupils to know, their duty to God and their duty to man, including their own bodies. How can we expect people who live in rooms habitually over-heated and ill ventilated to understand the value of fresh air? How can we expect girls who have never been in the kitchen and who know nothing about food to make thrifty and intelligent mistresses of missionary families or wise home-sisters to a community.

As to the question of drink, there is no doubt that the great majority of people working in the Tropics would be much the better for avoiding the use of alcohol as a beverage. Missionaries generally comply with this rule, probably more from a desire to set a good example to their scholars and converts than from motives of hygiene; there is, however, no doubt of the folly of taking alcohol in climates where the inevitable weariness and lassitude are so likely to lead people on from a harmless minimum to a maximum which is incompatible with health of body or mind.

To maintain health in the Tropics many habits of daily life need revision. Ordinary English folk eat too much meat, and, indeed, too much food altogether. The attempt to do this in a tropical climate is sure to lead to disorders of digestion and chronic ill-health. Plenty of milk, bread, butter, vegetables, and fruit, with relatively little meat, would be a more suitable dietary than the heavy breakfast, lunch and dinner which is usual with Europeans in India.

Another very serious danger to health in the mission field is the difficulty of procuring good milk and pure water.

Milk is not attainable in some places, in others it is very poor in proteids and in fats; in nearly all stations it is liable to contamination with dirty water, or by being drawn from unwashed udders by dirty hands. The wonder is, not that typhoid, dysentery, and other microbial diseases are conveyed by milk, but that any one escapes infection. The only way to guard against such illness is for some responsible person to see the cows milked and to insist on the observance of all reasonable precautions.

The storing of milk is a difficulty only less urgent than ensuring its original purity. In hot countries milk is a highly putrescible fluid and rapidly becomes unfit for use. This difficulty, like the difficulty of guarding against its containing germs of tubercle and other diseases, is met to some extent by boiling or

sterilising. Neither of these methods is wholly satisfactory, for even sterilisation affects the food value of the milk.

Water is the staple drink and also the most frequent vehicle of disease. The source of water supply, whether river, well, or tank, is too often open to the grossest fouling; one and the same collection of water being used as sewage carrier, as washing ground, and as drink for man and beast.

The carelessness of all concerned, Government, missionaries, European residents and natives, is marvellous. The merest common-sense should enforce the rule, "The rain to the river, the sewage to the soil," but no, those who should know better allow the sewage to enter the river, while the rain collects in shallow depressions round the houses. Typhoid, cholera, dysentery and malaria follow in the ordinary course of Nature, and those whose ignorance and carelessness have caused the catastrophe talk of heroic self-sacrifice and the deadliness of the climate—truly "the people is destroyed for lack of knowledge."

The water supply can never be trusted, and the only safeguard is to drink none that has not been boiled and kept covered from dust and other sources of contamination.

Choice of Houses, Construction of House, Selection of Sites.—In well-settled countries, such as many parts of India and China, the individual missionaries find their houses ready for occupation, and have no responsibility as to choice of site or construction of house. A heavy responsibility does, however, rest upon those who choose the house itself. From a desire that the missionaries should live as much as possible amongst their people, the heads of missions too often select houses in the native quarter of the town. Such houses are very likely to be built on native principles of sanitation and comfort, which it is needless to say are neither suitable nor desirable for Europeans. In many cases they are in immediate proximity to the open gutter, which serves the purpose of a general sewer; ventilation is conspicuous by its absence, and there is a general want of convenience and comfort. Far worse than this, there are the many diseases which are immediately communicable from man to man, either directly or through the mediation of mosquitoes, flies, ticks, &c. Europeans living in the native quarter are exposed to all these dangers, and also suffer from the absence of open spaces, proximity to the country, or the sea-shore.

Of course, every one understands the desire of the missionaries to be near their work and amongst their people; much fatigue and expense is saved by not having to make journeys to and fro, and another inducement is undoubtedly the hope that by living a Christian life in the midst of their heathen neighbours their example may be like "the city set on a hill which cannot be hid." All the same, it is to be feared that the balance swings entirely towards evil rather than good, for it is not possible for Europeans living under such circumstances to maintain their health, and with the loss of health comes loss of efficiency, and in many instances loss of temper and of many of the moral qualities which are so necessary in dealing with the heathen and with converts. It should therefore be a matter of principle with those responsible for such

matters, that missionaries' houses should be sufficiently removed from native quarters to enjoy an abundance of air and sunlight; they should, if possible, have upper rooms in which to sleep; the trees should not be permitted to grow too close to the house; and all shallow tanks and puddles should be filled in. Beyond all these things, it is necessary to see that the servants' quarters are as far removed as possible from the house. It is now well known that mosquitoes are the carriers of malarial infection, and that few native children are not hosts of the malarial parasite; if, therefore, the servants' quarters are near to the house, there is nothing to prevent the mosquito from carrying the malaria from one to the other.

There is real sense as well as economy in having but little furniture and no hangings in tropical houses. Any curtain or garment hanging up is simply a hostel of which the mosquito avails itself freely; sheets and clothing having been hung in the sun to dry ought to be folded up and put away into bureaux or boxes, for when they hang in the sleeping rooms they become a positive danger.

It is a distinct advantage to have fine woven wire to fit into the windows and doors, made so that they can be open in the day and closed at sundown. The mosquito is chiefly a nocturnal creature, and ought, if possible, to be excluded from the dwelling.

An excellent modern device is a sort of small tent of gauze within which a chair and table can be placed. This enables any one to read or write without the annoyance and danger of being bitten by mosquitoes. Among minor safeguards are the rubbing of the skin with oil of lavender and the wearing of high boots, putties, or gaiters.

It often happens that in breaking fresh ground and laying the foundations for a new mission station, the responsible head has to choose a site which shall be suitable for the mission houses. This should be, if possible, on a sloping ground with no houses above it. The servants' quarters should be a considerable distance away and at a lower level. It is also most desirable that there should be no half-way house between the European and native quarters, for the mosquito is capable of flying about 500 feet., it then settles on some vantage ground, and gathers strength for a further flight. Abundant provision should be made for dealing with refuse and with household slops. It is absolutely immoral to permit excreta and rubbish to foul running water or to enter a lake, tank, or well. There is no doubt that the earth system is the only one practicable, but this demands very careful management or the heavy rain will wash away both earth and excreta, fouling all the ground in the neighbourhood.

Another point that should engage the earnest attention of the selector of a site is that there should be no swamp or marsh in the neighbourhood. There was a great deal of unconscious wisdom in those of old time who spoke of malaria as "marsh fever," for although it is by no means a miasma or an emanation from marshy soil, yet shallow and stagnant water affords a breeding ground to the mosquito, which is itself the cause of the scourge.

It is curious to look back to one's student days and to remember how we were cautioned to advise

travellers to encamp to the windward of groves of trees or of running water; of how they were advised to kindle fires between themselves and the marsh, and how it was supposed that the deadly miasma was of so particulate a nature that it did not readily pass through the meshes of a mosquito net, in the same fashion as it was known that fire-damp did not pass through the closely woven wire gauze of the miner's safety lamp. All these facts were true, but our interpretation of them was erroneous.

In the matter of the construction of a house much must depend upon the materials available, but it has been abundantly proved, especially in the history of the Universities' Mission to Central Africa, that the health of the missionaries is much more stable in well-built houses whose walls are thick, whose foundations are well laid, and in which there is an abundance of air without draught and without exposure to wet mists. No doubt pukka-built houses are more expensive, whether they be fashioned of bricks, stone, or rubble faced with chunam. There was no doubt cheapness, immediate economy, and perhaps some romance in living in wattle and daub huts thatched with palm leaves; but after all, nothing in the mission is so valuable as the health and lives of its members, and therefore no expense within reason can be considered extravagant which really secures their safety.

Amount of Work, Exercise, and Rest.—There is no doubt that owing to zeal and enthusiasm outstripping discretion, many missionaries, and especially the younger members, are extremely careless about their health. When they first come out they are in most instances quite ignorant of the dangers of the climate, and even if they understood they would be disposed to think that their good intentions would protect them from harm. It is very difficult to persuade new-comers that the tropical sun is deadly, and that it is not safe to walk out (except in the very early morning and evening) without the protection of pith helmets, white-covered umbrellas, and dark glasses. It is also difficult to make new-comers understand that active and outdoor work ought to be accomplished as far as possible in the cool of the morning or evening, while the middle of the day should be devoted in part to learning the language or other mental occupations, and that, having in view the very early hour of rising in the morning, some two or three hours should be spent in rest.

Another danger which is not generally appreciated at its right value by the young and enthusiastic is that work of all kinds should be taken quietly and steadily, that there should be no rush or worry over it. Some of the young missionaries feel that every day spent in the acquisition of the language is a day lost to their Master's service, and they consequently are anxious either to scamp this most necessary part of their preparation, or to work so hard that eyes and brain are alike overstrained and injured. No one can say how many hours a day any one ought to work, this must be a personal question, for whereas one individual can work at the language with impunity for five or six hours a day, other less mentally robust individuals cannot do more than two or three hours without danger of "knocking up."

Exercise is a duty greatly disregarded, especially by

women in tropical climates; they suffer much from lassitude, and the slightest exercise is liable to be accompanied by profuse perspiration, and by development of prickly heat; they are therefore disposed to shirk physical exertion as much as possible. This, of course, leads to indigestion, constipation, and frequently to sluggishness of the liver and headache. Unfortunately most people have an idea that these ailments are to be remedied by drugs, and they are very unwilling to follow the natural and proper course of increasing their exercise; others have a belief that any exercise beyond ordinary walking, such, for instance, as croquet, lawn tennis, and cricket, are of the world, worldly, and unworthy of the enthusiastic and devout missionary. It is quite necessary to persuade them that so long as they are under earthly conditions they need to take ordinary care of their health, and that the form of exercise which is found to promote that is the one by which they can best honour God. It appears to be greatly a matter of habit, for thousands of Europeans keep themselves in excellent health even in malarious and trying climates by taking regular and steady exercise, by working reasonably, by resting sufficiently, by eating suitable food, and in one phrase by "walking in the paths of physiological righteousness."

Care of Minor Ailments, Chills, Slight Fever, Diarrhœa, Toothache.—There is a good old saying, "Take care of the pence and the pounds will take care of themselves," and one would fain remind missionaries and other dwellers in tropical lands that if they would attend to slight ailments there would be a much better chance of remaining free from grave disease. Many an apparently trivial indisposition is either the commencement of real trouble, or at any rate prepares the way for catastrophe; e.g., a heedless new-comer finds it delightful to sit on the roof of the house or on the verandah after the evening meal; they attribute no importance to their damp garments and perhaps chilly sensations; it is not until fever or other serious trouble develops that they can be brought to realise the un wisdom of their pleasant rest.

All rapid chilling of the skin, and dampness, even although slight, is of far more importance in tropical than in temperate climates, and ought to be carefully avoided, chiefly by wearing thin woollen garments next to the skin, and by providing light woollen or silken wraps to put on when driving after sundown, sitting out, and after getting hot with taking exercise.

A very slight deviation from health in the matter of indigestion or of diarrhœa should be carefully treated by rest and by minute regulation of diet. Of course the old wives' fables about the diarrhœa which became cholera can be classed with the similar fable of a quinsy which became diphtheria. We know that grapes do not grow from thorns, nor figs from thistles, but the gastric and enteric catarrh may prepare the soil for the germination of the vibrio of cholera, just as the inflamed tonsil is a ready breeding ground for Loeffler's bacillus.

Perhaps the heading of *toothache* may excite a smile, but it is one of the most harrassing and incapacitating of ailments, and seriously interferes with

the duties and happiness of life, and not only so, but when abscesses form at the root of the teeth and a condition of pyorrhœa alveolaris develops, the individual's standard of health will certainly be greatly lowered, and it is very probable that serious illness may follow. Dr. William Hunter has taught us the intimate connection between some forms of pernicious anæmia and oral sepsis, while other observers have pointed out a similar connection between oral sepsis and a form of rheumatoid arthritis.

(c) *Dangers of Mosquitoes, Flies and Ticks.*—Enough has probably been said of the dangers of mosquitoes and of some of the methods of minimising them, but a brief *resumé* may be useful.

It is now generally recognised that mosquitoes are the intermediate hosts of the parasites which cause malaria and yellow fever. Many experiments have been made, and the evidence inconclusive, men may live safely in the most malarious districts *provided* that they can protect themselves from the bites of mosquitoes. On the other hand, people may be bitten by infected *Anopheles* here in London, and will in due time develop malaria.

The great problems are:—

(1) How can the *Anopheles* be prevented from breeding near human habitations?

(2) How can Europeans defend themselves against the bites of these small assassins?

The *Anopheles* breed in shallow and stagnant water, therefore houses should not be built near any swamp or marsh, nor on ground in which there are shallow depressions liable to be filled by rains; the neighbourhood of irrigated lands is specially to be avoided. All marsh-land should be drained, if possible; puddles and shallows should be swept out and dried. Sometimes coating with a film of paraffin is easier. All windows and doors should be fitted with fine wire gauze shutters, which must be closed at sunset. The rooms should then be fumigated, and all parts of the sleeping rooms should be thoroughly searched and flapped with towels to disturb and kill any sleepy mosquitoes. All beds should have sound and good mosquito nets, and a portable canopy should be used by each individual in the evening—a canopy under which a table and chair can be placed.

Any one walking out after sunset should protect the feet and ankles with gaiters or putties, and all exposed parts of the body, such as the face and hands, should be smeared with lavender oil.

As said before, native huts must not be built near European houses, and native children must not be allowed about the house or verandahs.

It is also certain that disease may be propagated by various kinds of flies, and there is a fever known as "tick fever." One of the commonest troubles in some parts of the mission field is a particular form of purulent conjunctivitis, the infection of which appears to be carried by eye-flies. In this case, again, the fly would appear to be, at any rate, the agent by which the infection is transferred from natives to Europeans.

(f) *The Annual Holiday and the Home Leave.*—These breaks in mission service are absolutely essential to the maintenance of health and of efficiency. Most workers find that a yearly holiday is essential even in a temperate and healthy climate, still more

is it urgently needed by those who work under the great strain and stress of a hot, moist climate, combined with heavy work, much anxious responsibility, and constant exposure to disease. In most cases a healthy holiday may be had each year by a visit to the hills, or by going for a sea voyage. Leave time should be enforced after two years' service in exceptionally bad climates and after five years in less trying stations.

(g) *Daily Dose of Quinine.*—When living in really malarial districts and on the march, it is right to take daily doses of quinine—two grains with the early tea, and one or two after lunch and dinner. Few people cannot take quinine in some form, and even the large doses which are necessary to prevent an expected attack may be taken without unpleasant consequences if mixed with hydrobromic acid. It is to be remembered that when once malarial infection has been established a recrudescence is easily provoked by chill, exposure to the sun, fatigue, and indigestion.

A patient suffering from malaria must be carefully protected from being bitten by mosquitoes, for they suck in the germs of the parasite with the blood of the invalid, and subsequently inject them with their saliva into other people. In this sense, and in this sense only, is malaria infectious.

(5) CARE OF HEALTH WHEN ON FURLOUGH.

(a) *Medical Examination and Advice on Arrival.*—It is impossible to urge too strongly that every missionary should be seen by the medical officer of the mission immediately on return from abroad. Cases constantly occur in which missionaries who have been invalidated home at the end of their term of service fail to report themselves on arrival. The idea is that merely coming home will cure their ailments, and consequently they drag on, their dysentery becoming chronic, their malaria smouldering, and their anæmia scarcely relieved. They think they ought to be well, and act as if they were well, eating ordinary diet, incurring considerable fatigue, and steadily preparing themselves to join the ranks of the non-efficients.

If all missionaries were seen and examined on return and submitted their "health history" to the medical officer of their society, they would receive valuable advice and treatment which would generally ensure the re-establishment of their health, and enable them to return to the field with renewed health and capacity for work. In some few cases the medical officer or the advisory board would report that the missionary was unsuitable for the foreign field, and should be employed at home or struck off the active list. Such a decision, although no doubt reluctantly made and full of sadness, would often save the life of the missionary, and would defend the mission from serious pecuniary loss. No one should be permitted to return to the field who had suffered from black-water fever, frequent attacks of ordinary malaria, repeated attacks of dysentery, and, above all, those whose nervous systems could not stand the storm and stress of climate and work.

The medical officers would also be able to advise returned missionaries as to work while on leave.

Some missionaries wish to employ part of their holiday in study; for instance, men desiring to take

holy orders, men and women doctors anxious to obtain superior qualifications or increased experience. In many cases this may be permitted, and the medical officer will be able to offer advice as to opportunities for study and possibility of assistance. In other cases the missionary may be able and willing to do deputation work, or otherwise to assist the society while at home, but no one should be permitted to work without being examined and passed as fit.

(b) *Choice of Locality for Holiday.*—Another point on which advice is likely to be needed, but is not likely to be sought, is on the subject of where to spend the holiday. Many missionaries are members of poor families, their relations live in small houses, badly situated and badly found in all respects. All of us can remember instances in which the weary, toil-worn missionary returns to a poor and comfortless home, to worse food than she had while at work in the field, and sometimes to be the domestic drudge, or the willing but most unsuitable nurse to a home invalid. Can it be wondered at that furlough so spent fails to do good, and that the missionary's subsequent record is disappointing? Modestly and simply as our brothers and sisters live in the field, inferior though the meat, bread and milk undoubtedly are, yet they enjoy perpetual open-air life, a comparatively abundant service, and a blessed absence of pecuniary cares. When they come home, the advantages of climate are sometimes greatly minimised by the circumstances of their homes. Some one on the home staff should know the circumstances of each member of the mission, and should be in a position to offer hospitality for a portion of the leave at a hostel or home of rest connected with the mission.

It might be possible in some missions to have a holiday fund from which grants could be made in certain cases to enable those who could not otherwise afford it to go to the country, seaside, or wherever the medical officer might think best.

(c) *No Deputation Work on Short Furlough and none on Long Leave until Health is Re-established.*—When missionaries come home for really short periods, say for six months or less, it is not desirable that they should do any deputation work. Their time for rest and refreshment is short, and should be spent in recovering health and elasticity; the policy of permitting them to work during short leave is mistaken and shortsighted. When the leave is longer, deputation work may be permitted, but only when sanctioned by the society's medical adviser. Some people, men as well as women, have no gift for public speaking, and suffer acutely from nervousness on such occasions. They should not be subjected to this trial.

(d) *Medical Examination some Months before Expiration of Leave.*—Finally, no missionary should be permitted to return to duty without the written sanction of one of the society's medical officers. This sanction should be sought in good time, otherwise unnecessary expense and annoyance are caused by the preparation of outfit and the securing of a passage.

Usually two months will amply suffice, for it is pretty certain that a missionary due to return to work in October should be able to pass the medical exami-

nation in August. It would usually suffice for the society to nominate a trustworthy practitioner in the nearest town to the place where the missionary was living.

SOME STRIKING FACTS ABOUT AN EASTERN CITY.

By R. H. BRENRIDGE, M.A., M.B.Oxon., B.Sc.Lond.,
Bangkok, Siam.

SITUATED at the mouth of a very large river and in about the same latitude as Madras, is a city with about three-quarters of a million inhabitants. At least half of these are Chinese, and the remainder, with the exception of some other Asiatics and a few Europeans, is made up of Siamese. Bangkok, for that is the name of the city, is surrounded by flat, low-lying, very marshy country, and has a mean temperature of about 83.5° F., and a rainfall of 46.5 inches. Strong winds do not prevail, and there are many collections of water with a constantly smooth surface most convenient for the breeding of mosquitoes. Moreover, there are vast hordes of mosquitoes and many *Anopheles* among them. Everything would seem to have been arranged by Nature to promote malaria, yet there is very little in the town itself. Severe cases come in from the country, but among the genuine town-dwellers malaria is certainly far from common. An American doctor, of nineteen years' experience, stated lately that he did not think he had seen twenty cases of malaria among genuine town-dwellers. Such a statement is open to criticism, but it serves to show that malarial fevers are infrequent.

It is not possible to get the mortality figures or case incidence of any disease—there are no such records. However, by collecting the experience of credible European doctors in charge of the police, army, navy, jails, &c., &c., a shrewd guess may be formed.

The laws and regulations for the care of the public health are easily described. There are not any. Docketed away somewhere in a dusty pigeon-hole there may be some, but for all practical purposes the layman is never made to know them.

Running along the front of the houses are open drains, into which it would appear anything may be and everything is thrown. These drains empty themselves, when they are not stagnant, into the various canals, and the canals intersect the whole city, forming one of the chief methods of communication.

Many houses face on these canals and derive their water supply from them, and that not after any method of filtration, but directly. Such water is used not only for all domestic purposes, but also for cooking and drinking.

The central jail, in which are approximately 2,000 prisoners, empties its surface water and liquid refuse into a canal about the size of that in Regent's Park, London. The jail takes its water supply from the same canal, and at a place some few yards from the position of the sewage outlet.

For the general use of the town there is no water supply other than the canals. True, one or two arte-

sian wells have been already bored, but as yet they do not seriously, if at all, affect this statement.

Typhoid and Cholera. Typhoid is not a common disease, and cholera, though continually present, does not assume the proportions of even a moderate epidemic.

Be it known that the stench from the open drains is truly dreadful, and that during the dry season, when the canals are quite empty at low water, the flushing of many of them is practically a negligible factor. Yet it is quite usual to see men, women and children living and having their being alongside these drains, and in this atmosphere of stink. Moreover, they look and seem well.

Plague has recently appeared among us, and some European doctors predicted and feared terrible consequences. A case of plague has occurred here and there at lengthy intervals, but the records have not yet attained epidemic proportions, yet everything would seem to be in favour of the plague.

Some parts of the city, notably the Chinese quarter, is crawling with humanity. Here land is sold by the square inch. Everything that can be called a house is full from the floor to the ceiling, and the mainway between the houses is but a narrow path. There is no drainage, no water supply, no anything, and, strange to relate, no plague. Why, no one knows.

To deal with such a place according to the most elementary ideas of sanitation means its entire destruction as the only possible beginning, and this would cost about six times the annual revenue of the country.

Bangkok would be to a man of fixed ideas about sanitation nothing less than an awful nightmare, and yet it is not over unhealthy. Indeed, the general look of the European women and children is better than in many well-cared for stations in India. They are not pasty-looking and tired, and they are not ill.

It is difficult to resist asking one's self the question, whether it would not be unwise to interfere here, and graft a partial European system, almost inevitably indifferently carried out, on the present order of going. Now, there would seem to be some sort of natural balance set up between the contending micro-organisms, and that in the fight for existence among themselves they are protecting us "humans." To alter the whole place immediately, and put everything under human control, is impossible. The necessary engineering work is lengthy and the cost enormous. Half measures may mean a disturbance of the already existing balance, and the ultimate result a less healthy city. It must always be recognised that to disturb a natural arrangement unless you can see far ahead may in the end be most disastrous.

Witness the island of Jamaica. To kill the rats infesting the sugar cane the mongoose was introduced; the rats were exterminated; the mongoose then became a plague, and has got rid of all the lizards, harmless snakes and small birds. As a consequence insect pests abound, and among them is a troublesome tick, which destroys the cattle. This tick having had all its enemies removed by the mongoose flourishes luxuriantly. The last state of Jamaica is worse than the first. Bangkok may repeat the history of Jamaica. Improvements may not lead to such satisfactory results as were anticipated.

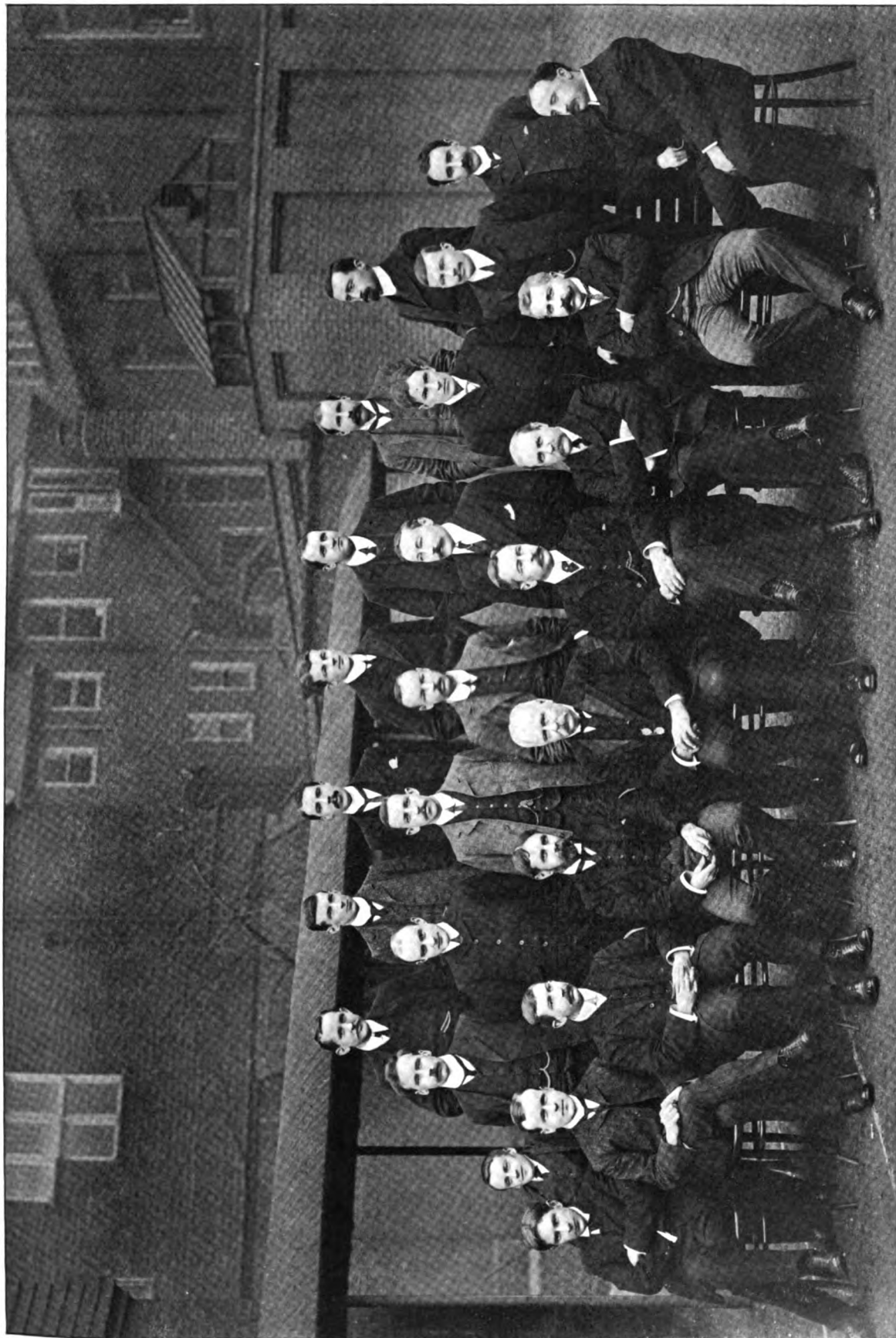
Give Bangkok closed drains and all that goes to make up a sanitary paradise, and Bangkok may during the years of changing have epidemic plague and epidemic cholera, and malaria in plenty. Be that as it may; constituted as it is to-day, without any efficient machinery to ascertain the numbers, and causes of death, without any drainage, without any water supply, without any registration of accredited apothecaries, much less doctors, without, in fact, anything but the barest skeletal beginnings of medical control, Bangkok has all the possibilities of becoming a very volcano of pestilence, and perhaps a fortnight of unusually cold weather, or something equally trivial, will start the eruption.

SEA VOYAGES FOR INVALIDS.—The discussion on "Sea Voyages for Invalids," published in the *Journal of Balneology and Climatology*, January, 1906, provoked a number of opinions as to the advantages and disadvantages of sea travel for invalids. The consensus of opinion, including that of Dr. Robert W. Felkin, who opened the discussion, seemed to be, as a rule, against the treatment. He stated that the principal ailments which precluded a sea voyage are: (a) The strength of the patient—if there is too great exhaustion it is better to keep him on land; (b) grave dyspepsia; (c) hepatic enlargement; (d) cardiac dilatation; (e) pyrexia or any inflammatory condition; (f) any tendency to hæmorrhage; (g) epilepsy; (h) insanity; (i) pregnancy; (k) patients suffering from eye diseases; (l) any kidney disease; (m) phthisis, except, perhaps, in the very first stages, and I think even then such a patient should occupy a deck cabin alone." Dr. F. Sandwith's remark that:—"The doctor who sent many patients to sea was generally one who had not done much travelling in bad weather," succeeded best perhaps in summing up the situation. Chloretone was mentioned by Dr. Leonard Williams as the drug which had proved most successful in alleviating sea-sickness.

The *Geographical Journal*, for March, 1906, contains a useful abstract of a paper by Dr. J. Hoffman, in *Petermanns Mitteilungen*, 1905, Nos. 4-7, on Minimum Temperature in Tropical Africa. The area dealt with is the south equatorial region, more particularly the high plateaux of East Africa. The author discusses the effect on the minimum of temperature of elevation, distance from the sea, rainfall and winds throughout the year, and attempts to deduce some general laws therefrom. He finds that the minima diminish with distance from the coast, and increase of latitude, but the variation with altitude cannot be stated simply, as the diminution is affected by many disturbing factors.

The facts are different, e.g., for stations on a mountain range, on a plateau, or on the slope of an isolated peak rising from a plain; the general law of diminution for elevation holding good least of all for a mountain region cut up into valleys. Humidity and cloudiness are also disturbing factors as illustrated, for example, that under these circumstances a minimum of 39.2° F. was observed at 2,675 feet, near Rinvenzori, whereas so low a temperature had never been recorded up to 6,230 feet on Kilimanjaro.

The important question as regards agriculture, of the limits of night frosts is also considered and the conclusion arrived at is that, near the equator, there is no good evidence of actual frost at any height under 6,500 feet, though cold nights approaching freezing point are not uncommon.



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THE

Journal of Tropical Medicine

APRIL 16, 1906.

THE DAILY RANGE OF HEAT AND HUMIDITY IN TROPICAL COUNTRIES.

OF the different meteorological data that are required for the comparison of climates, there is no one as to which so much misapprehension exists as to that of humidity. The reason of this is to be found in the fact that direct quantitative figures are absolutely useless for comparative purposes, as such figures convey no idea whatever of the dampness or otherwise of a place. Even in the heart of the Sahara, the actual weight of watery vapour present in the air seldom, if ever, is as small as it is in London during a November fog; but in spite of this, the fierce dryness of the desert in June rivals for inconvenience the damp misery of a "London special."

The reason of this is that the amount of water that the air can carry without deposition varies with the temperature, and that it is only when the air approaches saturation that the sensation of damp is conveyed. Under other conditions, watery vapour is as "dry" as any other gas, for our sensations inform us not as to absolute but to relative dampness. Macaulay's school-boy would probably have been aware of this had he belonged to the present generation; but what is not generally recognised is the corollary that, with the daily changes of temperature, relative humidity is constantly changing from hour to hour, and that con-

sequently observations from different places are in no way comparable unless they are taken at corresponding hours of the day. For strict comparison of places widely differing in latitude, it is not sufficient that they should be taken at the same hour of the day, as owing to the great differences in the length of the daylight hours at different latitudes, observations at the same hour are only exactly comparable at the equinoxes. At all other times of the year equatorial climates are made to appear comparatively too dry in the winter and too moist in the summer, as for comparative purposes, where only one or two observations are taken during each day, it is essential that they be taken, not at the same hour, but at the same interval from sunrise and sunset. Observations such as this, necessitating different times of observation for each month, are, however, almost out of the question in actual practice, and fortunately, within tropical and subtropical limits the day does not differ sufficiently in length to seriously vitiate the comparison of observations taken at fixed hours. But even in stations under the same flag, the hours of observation vary greatly, and nowhere more so than in our British colonies, so that it cannot be too clearly understood that comparisons of relative humidity are usually utterly fallacious unless it be clearly recorded that they are taken at the same hour, or that careful and somewhat difficult corrections be made to compensate for the different times of observations.

In humidities of about one-third of the possible water-holding properties of the air, it happens that a rise of one degree Fahrenheit in temperature corresponds almost exactly with a fall of 1 per cent. of relative humidity, and it is therefore convenient to commence our study of the normal curves of these two climatic factors with an example of a climate of this sort. The number of stations where hourly observations of sufficient duration have been taken is but small, and we are therefore somewhat restricted in our choice; but the case of the climate

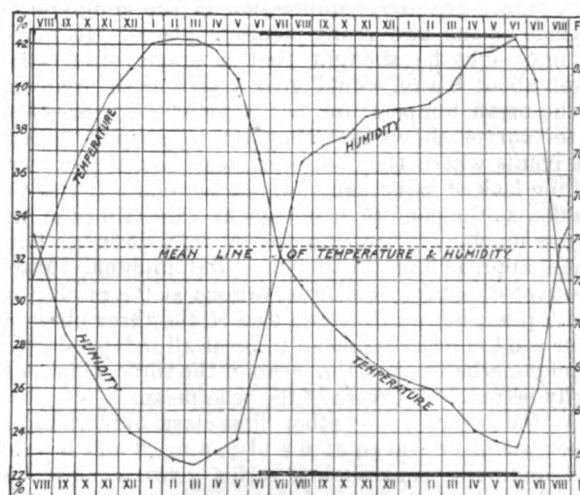


FIG. 1.—Diagram of diurnal variation of temperature and humidity at Pachmari during March. The figures on the left refer to percentage humidity, those on the right to temperature (Fahrenheit). The heavier horizontal border lines indicate the hours of darkness.

of Pachmari, in the Central Provinces of India, for March, which is graphically represented below, will serve sufficiently well for our purpose.

The first point that strikes the eye in examining these curves is their almost perfect symmetry, which is the more remarkable as they are plotted from the data of a single month; and we may be sure that in a term of years the curves would smooth out to perfect regularity. This is, of course, only what is to be expected from the ordinary law of physics, and is merely an expression of the fact that the *absolute* amount of watery vapour in the air can vary but little from hour to hour, save in exceptionally circumstanced localities, such as those influenced by diurnal land and sea breezes.

It will be noticed that both curves start from the mean line about 8 a.m., and leave it in opposite directions. At first very rapidly and then more slowly, till they respectively reach their maximum and minimum points, which in the case of temperature is reached about 2.30 p.m., and of humidity shortly after, at 3 p.m.

From this time the changes are slow until 5 p.m., after which the fall of temperature and rise of humidity are extremely rapid until 8 in the evening, the mean line being crossed about 7 p.m.

From this time the temperature falls and the humidity rises steadily till 6 a.m.; after which, with the rising of the sun, both lines turn steeply back to regain the mean again at 8 a.m. It will also be noticed that while the curves of the heat of the day form bold and fairly symmetrical loops, those of the cooler hours are quite different, the fall of temperature being very slow in comparison with the rapid rise after dawn. Now, 7, 8 and 9 in the morning are very favourite fixed hours for taking meteorological observations, and it will be observed that two observatories placed side by side at Pachmari, one of which observed at 7 a.m., while the other did so at 9, would record relative humidities of 40.5 per cent. and 28.5 per cent. respectively, while the difference between 7 and 8 a.m. is quite sufficient to give an entirely erroneous impression of the comparative dryness of the two really identical places. It might at first sight be thought that a single observation taken about 8 a.m. would give a very close approach to the mean temperature, but a moment's inspection of the curves shows that they are so steep at both of the points where they cut the mean line that a very trifling lack of punctuality would seriously vitiate the results, as the conditions change at these times of the day as much in a few minutes as they do in an hour when approaching the maxima and minima. Many observatories take their observations at 9 a.m., 3 p.m. and 9 p.m., but on this plan two of the three observations are too near the mean to be at all independent of exact punctuality, and the mean of the three will necessarily be much in excess of the true mean.

At Cairo and some other first-class observatories, observations are taken at 6 and 9 a.m., 3 and 6 p.m., and midnight; and such a series gives a close approach to the true mean of the year, but it cannot be trusted in the case of individual months, as a very casual test of the plan brought to light months in which these data yielded results as much as 2.5 per cent. different from their true mean, which is no better than is afforded by the mean of the maximum and minimum

humidities alone, without taking any other data into the calculation. On entire years indeed, mean humidities calculated on this latter plan seldom err by more than 1 per cent., so that though for annual figures the plan of five observations may be admitted to give a closer approach to the true mean, its advantages over the simpler method are quite inconsiderable.

But elaborate observations of this sort are only possible in observatories of the first class, and we are probably well within the truth in surmising that the stations where they are taken might be numbered on the fingers for the entire British Colonial empire.

Moreover, unless they be supplemented by separate figures obtained on some simpler plan they are quite as useless for purpose of comparison with the great bulk of stations as those of the humblest observatory with its single part-time observer, from whom at most but two daily observations can be expected. We have already seen that morning and evening observations are undesirable, because at these times of the day the changes are so rapid as to lay them open to many fallacies, not the least of which is that even in sub-tropical regions the varying length of the days will bring about considerable differences in the apparent results of different months.

We are thus reduced to observations taken near the maxima and minima, but one of these occurs at night, and the other in the busiest hour of the day, and so cannot be reasonably expected from part-time observers.

We are reduced, then, to the necessity of employing self-recording instruments; and as thermographs and other continuously recording instruments are expensive, delicate, and troublesome to manipulate, we are practically reduced to the employment of maximum and minimum thermometers which are open to none of the above objections.

In other words, it is proposed to employ wet bulb maximum and minimum thermometers, and to employ these in conjunction with the corresponding dry bulb instruments to calculate the maximum and minimum humidities. The only objection that can be advanced to this proposal is that the wet bulb extremes do not always coincide in time with those of the dry bulb. Now, the principal reason of this is that wet bulb thermometers move more slowly, and therefore have a tendency to lag behind the dry instruments, but the same objection may be taken to all hygrometric observations deduced from these instruments at any possible time or combination of times; and though irregular factors may slightly vitiate the advantages of the proposed plan in fickle climates, such as that of England, an examination of the above and following curves, as well as many others that have been plotted, shows that this source of error cannot be considered as of any practical importance in the case of hot climates. Moreover, in the case of temperate climates the irregular factors of this source of error necessarily have a tendency to correct each other in any at all extended series of observations, even such as a month. Above all, the results of the plan would be strictly comparable, a character entirely wanting in our meteorological returns as at present constituted.

The accidental relations of a change of 1° F. in temperature, corresponding to 1 per cent. of relative humidity is, however, confined to very dry climates.

Under conditions of greater moisture, the percentage of humidity alters much more rapidly than the temperature, as expressed in degrees Fahrenheit; so that at humidities of about 65 per cent. a change of 1° F. corresponds to a change of 2° F., and in ordinary equatorial and insular warm climates, the proportion is even higher, and may reach as high as 2.4 per cent. of humidity to the degree Fahrenheit; though in exceptional cases, as in the almost saturated climates of tropical hills, there appears a tendency for the ratio to fall as saturation is approached.

These relations between changes of temperature and moisture appear to be fairly constant, and are represented by the diagram below (fig. 2).

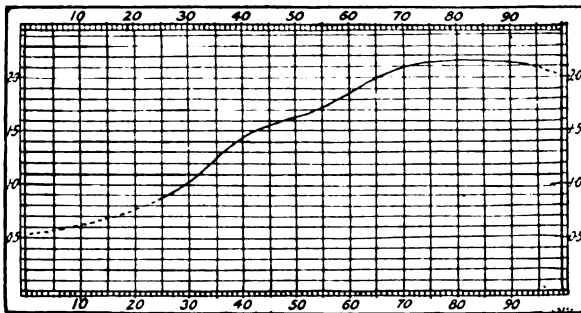


FIG. 2.—Curve illustrating the relation between the ranges of temperature and humidity at varying degrees of atmospheric moisture. The horizontal borders are graduated to percentage humidity, the vertical to the factor by which an alteration of temperature must be multiplied to obtain the corresponding alteration in relative humidity, *e.g.*, the curve cuts the vertical of 30 per cent. at 1°, at which humidity an alteration of 1° F. corresponds to a change of 1 per cent. relative humidity, while at 63 per cent. humidity a change of 1° F. is associated with that of 2 per cent. relative humidity.

The information so afforded is necessarily only approximate, and has been obtained in a purely empirical manner, but is really of practical value, when it is desired to make a comparison of data collected at different hours, the more as the mean temperature does not appear to notably affect the ratio, at any rate within the climatic limits we are considering. On this account it is commonly more convenient in diagrams to plot the changes of humidity on half of the scale of those of temperature, and this plan is adopted in fig. 4, the last of the instances plotted.

Moist air is a much better conductor of heat than dry air, and also obstructs radiation, much heat being absorbed instead of passing through it. Changes of temperature are therefore much less rapid in moist climates, and the diurnal range of temperature much smaller. These differences are graphically illustrated in the contrasted ranges of temperature and humidity of the very dry climate of Jaipur in Rajputana for the months March, April and May, with those of Rangoon in Burmah for the months July, August, and September, though the mean temperatures of the two stations (78.7° F. for Rangoon and 84.1° for Jaipur) during those periods do not differ greatly. The mean humidity of Rangoon, however, during the period in question is 92.7 per cent., while that of Jaipur is but 33.5 per cent.

There are, however, other factors at work in the production of uniformity of climate than can be gauged by hygrometers installed at or near the ground level,

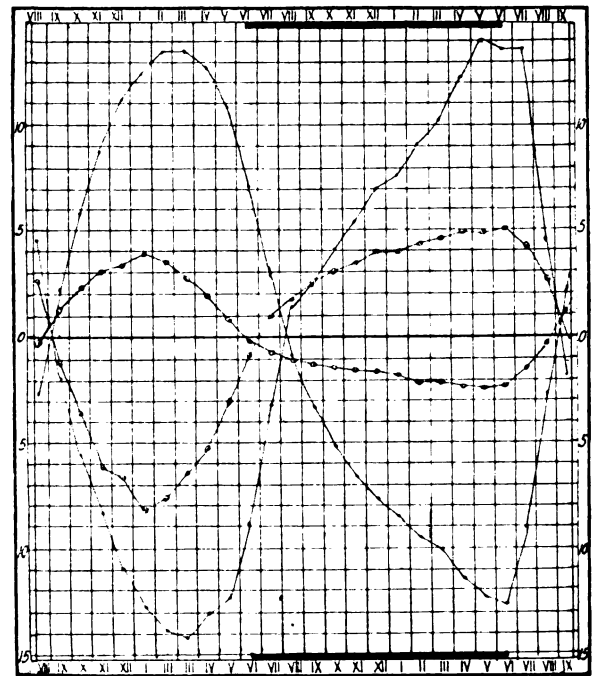


FIG. 3.—Graphic representation of the hot season in Jaipur, contrasted with the wet season in Rangoon. As in the last figure, temperature (Fahrenheit) and percentage humidity are plotted on the same scale. The lines with ringed nodes refer to Rangoon.

the principal of these being the amount of cloud which is determined by the hygrometric conditions not of the lower, but of the upper regions of the atmosphere which do not, by any means, necessarily correspond.

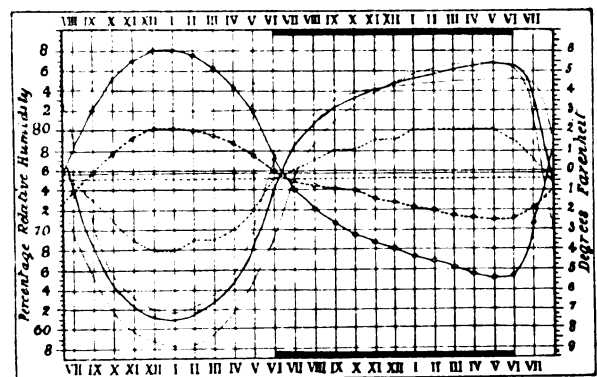


FIG. 4.—The above curves show the relation between temperature and relative humidity for a mean day calculated from hourly observation throughout the year. The heavy lines are the means of three years' observation at Mauritius, the dotted the same for Hong Kong. In each case the curves of temperature are indicated by the nodes being marked by small circles. The curves of temperature are plotted at 2° F. for each 1 per cent. relative humidity. The lighter lined curves are those of December and June for Mauritius for relative humidity.

The finely divided particles of water that form clouds and fogs are far less transparent and diathermic even than moist air; and the former not only greatly tempers the heat of the day, but also form a protective roof, which prevents loss of heat by radiation at night.

These differences are well shown in fig. 4, in which the diurnal changes for the means of the year are plotted for—the islands of Mauritius and Hong Kong respectively. An even more striking contrast might have been afforded by the extremely uniform climate of Batavia, but there the daily variation is so small that on the scale the diagrams are reproduced, the lines would be inconveniently near the mean lines for exact inspection. The mean humidities of the two islands, it will be seen, differ only by less than 1 per cent., and their mean temperatures sufficiently approach to each other for practical comparison. It will be thus seen that provided we are furnished with the maximum and minimum of temperature and humidity, and the average amount of cloud, we can form a very close estimate of the character of a climate and of its effect on the human system—apart from endemic diseases which usually depend on the quite different question of the geographical distribution of parasites, though these in their turn are necessarily much influenced by climatological conditions which thus, after all, are mainly responsible for the healthiness or sickness of any given locality.

G. M. GILES.

THE IMPERIAL INSTITUTE.

THE fourth number of the third volume of the "Bulletin" of the Imperial Institute, just issued, gives a short account of the present position and the work of what promises to be an eminently useful institution, when once it is in full working order. The Imperial Institute was founded as a national memorial of the Jubilee of Queen Victoria, and opened by Her Majesty in May, 1893. In 1900 the building became the property of the British Government, and in 1902 the management of the Imperial Institute was assigned to the Board of Trade. Sir Cecil Clementi Smith, G.C.M.G., and Sir Alfred Bateman, K.C.M.G., have been appointed a managing committee, and Professor Wyndham Dunstan, F.R.S., Director of the Imperial Institute at South Kensington.

The principal object of the Institute is to promote the utilisation of the commercial and industrial resources of the Empire, by arranging exhibitions of natural products of the various parts of the empire, and providing for the investigation and dissemination of scientific, technical and commercial information relating to them. The work of the Institute is now conducted by the Commercial Intelligence Branch of the Board of Trade, which is located at 73, Basinghall Street, London, E.C., and by the Emigrants' Information Office in Westminster.

Thirty-eight colonies and dependencies have their economic products arranged on a geographical system in the galleries of the Institute. A Bureau of Information has been opened to facilitate the supply of general information and the distribution of literature. A Scientific and Technical Department, consisting of well-

appointed laboratories, deals with the investigation of the new or the imperfectly known products of the colonies and of India, with a view to their utilisation in commerce; and British Consuls are encouraged to transmit natural products of the countries to which they are appointed. In the Institute is an excellent library as well as reading rooms, and three specially appointed rooms termed colonial conference rooms. The Cowasjee Jehanghier Hall is used in common by the Institute, the India Office and the London University for lectures, meetings and conferences.

Nor does the work of the Imperial Institute end with these, for the British Women's Emigration Association and the Colonial Nursing Association (Room 5) have had offices portioned off for their use and occupation. The "Quarterly Bulletin of the Imperial Institute" is a valuable publication, and not only announces the work being carried on at the Institute, but supplies technical information concerning many of the less known natural products of the British Colonies and of India. In the volume just published we find reports on "Cotton from the Federated Malay States," "Fibre of Asclepices Semilunata from Uganda," "Lokesi" fibre from North-Western Rhodesia, "Black Damar Resin from Assam," and several other articles of high economic value.

The "Bulletin," price 1s., is obtainable at Messrs. Eyre and Spottiswoode's, Fleet Street; Messrs. G Street and Co., Cornhill; or at the Imperial Institute, South Kensington.

SIXTH INTERNATIONAL DERMATOLOGICAL CONGRESS, NEW YORK, SEPTEMBER, 1907.

President: Dr. JAMES C. WHITE, Boston, U.S.A.

To the Editor of the JOURNAL OF TROPICAL MEDICINE.

DEAR SIR,—The Organising Committee of the Sixth International Dermatological Congress to be held in New York, September, 1907, has selected as one of its topics for discussion Tropical Diseases of the Skin. Can you, perhaps, suggest someone in Great Britain or your colonies to report on the subject from a dermatological standpoint?

Very truly yours,

JOHN A. FORDYCE, M.D.

80, West 40th Street, New York,

March 8th, 1906.

[Will those intending to take part in the discussions on Tropical Diseases of the Skin at New York, in September, kindly communicate with Dr. Fordyce direct?—ED. J. T. M.]

Abstract.

CONDITIONS AFFECTING THE LOCATION OF MISSIONARIES OR THEIR RETURN AFTER FURLOUGH.¹

By C. F. HARFORD, M.D.

Principal, Livingstone College, Leyton, London, E.

THERE are few questions more difficult to decide than those which relate to the influence of climate on the health of individuals. This is even the case with our own little island; and when we are called upon to

¹ Read before the Medical Officers of Missionary Societies, January, 1906.

advise those who may be called upon to take up work in distant regions of the world, the complexity of the problem is very largely increased from the fact that uniformity of climate does not exist throughout any large territory in any part of the world.

In the selection of suitable candidates for service in the mission field, although we may not all be agreed as to the exact points which should lead to disqualification, we are at one in requiring that candidates for foreign service should be physically sound.

It must be remembered, however, that the mission field is a wide one, and there are candidates who would be totally unfitted for work in some regions who might be able to do useful service in other parts, so that we need to use great discrimination in the selection of countries to which each Missionary may be permitted to go.

It will probably be best to adopt a geographical order, and to note the prominent characteristics of those countries to which Missionaries are most commonly sent, and in so doing we may select first the continent of Africa, which presents some of the greatest difficulties of climate, whilst parts of it may be included under the healthy regions of the world. It may be considered in five sections: (a) West Central Africa, including Senegal, and Niger and Congo basins; (b) East Central Africa, including Upper Nile districts and Zambesi basin; (c) highlands of Central Africa; (d) South Africa; (e) North Africa.

(a) *West Africa*.—West Africa has the unenviable reputation of being the most unhealthy part of the world, and by West Africa we mean the coast districts extending from the Senegal to the Congo, and including the country drained by these two rivers and the Niger. Probably the occurrence of very grave forms of malaria and the prevalence of blackwater fever account for much of the unhealthiness of the climate, but the houses are not, as a rule, carefully constructed, and often are built in close proximity to insanitary native huts; the food supply is in few instances well developed; there are no health resorts to which Europeans can readily go nearer than the Canary Islands, and there are little opportunities for exercise and recreation.

(b) The *East African* districts present very similar conditions to those found in West Africa, but the form of malaria is perhaps not quite so malignant, and there are better opportunities for obtaining change for recruiting health.

(c) *Highlands of Central Africa*.—Certain parts of Central Africa have proved to be much more healthy than the coast districts. This is the case in Uganda, where European Missionaries have been at work, and very few deaths from climatic diseases have taken place, and very few have been invalided home. In the high plateaux of eastern equatorial Africa even better health conditions are to be met with, and some of these appear to be quite suitable for European colonisation. The same sort of conditions are to be met with in the Shire Highlands in British Central Africa.

(d) The climate of South Africa is, in many ways, better than England, and in some parts would suit constitutions to whom the European winter is trying; malaria and bowel disorders occur in certain districts, but these may be largely prevented with care.

(e) *North Africa* possesses an ideal winter climate, but the summer months are exceedingly hot. If it is possible to take a holiday in a cooler region during the months of July to September, the climate may be suitable for many who could not work in a tropical climate.

Palestine and Syria.—What has been said about North Africa applies to a certain extent to these parts, but it should be remembered that malaria is very prevalent in Palestine at certain seasons of the year, and owing to defective sanitation in the chief cities, there is great risk of contamination of the water and food supply, and thus bowel disorders are frequent, and epidemics of cholera are not unknown.

Arabia, including Turkish Arabia, possesses a very hot climate, and in some seasons it is intensely hot, whilst here, again, sanitation is almost unknown.

Persia possesses a fairly temperate climate, and, apart from bowel disorders, there is very little climatic disease.

India.—The houses in India are more generally suited to the climate, whilst there is usually a good food supply, and good sanatoria can be found in the principal hill stations, which can be reached by a good railway system.

South India, with which we may include Bombay and the Central Provinces of India, is distinctly tropical; the east coast is more trying than the west, and there is more malaria in the east.

North India possesses a fairly temperate winter climate, and many Europeans pay visits to India during this season with very slight risks to health.

Apart from the definite hill stations, it is probably, true to say that the United Provinces possess the best climate. The Punjab, Sind and Rajputana probably rank next in point of view of healthiness, though the heat here is often most intense. Probably the most unhealthy is Bengal.

Burmah may be classed with Bengal on the point of view of climate, whilst the health conditions of Siam and the Straits Settlements may be compared with those of South India.

China possesses even a greater range of climate than India, but the sanitary conditions are bad, and there is, therefore, a tendency to bowel disorders. There is also a special strain on the nervous system in China; and Missionaries to China should have no tendency to mental or nervous disorder, either hereditary or acquired.

South China is distinctly malarious, and might be classed with Bengal. North China, on the other hand, has an intensely cold season, and is fairly free from any climatic diseases.

Japan.—The climate of Japan cannot be regarded as an unhealthy one, but there is one difficulty which must always be kept in view in selecting workers for Japan, viz., the great tendency to a curious form of headache, which is often spoken of as "Japan head."

America.—In the American continent our chief attention must be directed to the tropical regions which are to be found in Central America and to the north of South America. The health conditions in many parts are exceedingly unhealthy, and may be compared with East Africa, though the prevalence of

yellow fever must be taken into account, which does not occur in East Africa.

Tropical Islands.—Each of the important tropical islands has some special features of its own, and particularly with reference to the distribution of malaria. Naming the most important, we may mention Madagascar, Ceylon, East Indian Islands, and the West Indies. These are usually more healthy than similar regions on the continent.

Cold Climates.—There appears to be little climatic disease in cold regions, such as in the northern districts of North America, but there are great hardships to be endured, which require considerable powers of endurance.

The Return of Missionaries after Furlough.—There are many causes which may prevent the return of Missionaries to different parts of the field.

Individuals who suffer from persistent attacks of malignant malarial fever should be regarded as unsuitable for malarial climates. Repeated attacks of black-water fever should be regarded as a disqualification, and one particularly severe attack may, however, be regarded as equivalent to several slight attacks.

Continued diarrhoea is one of the most serious conditions which affect the prospects of useful service in the Tropics, and unless a permanent and satisfactory cure can be obtained, there must be no thought of return to the mission field.

Persistent nerve troubles, such as sleeplessness, headache, or any tendency to mental weakness, are signs of danger which must not be disregarded, especially as they are likely to be accentuated by further residence in the Tropics.

Other cases will be found in which there appears to be some particular idiosyncrasy which renders the individual unsuitable for work in one country or location, and yet which might not debar him from work in another climate. A reference to some of the climatic conditions of the different countries may help in finding the most suitable location.

Rebick.

J. Courmont, of Lyons, on the "Atmosphere," and C. Lesieur, of Lyons, on "Climatology," in a Treatise on Hygiene, published by P. Brouardel and E. Mosney, T. 1., fascic. i., pp. 124. Paris, J. B. Baillière. 1906.

The characters of the atmosphere are studied from the standpoint of public health. Ten pages are devoted to its chemical and twenty-three to its physical properties; the characters of free and confined air being separately considered. Another ten pages are given to the question of inorganic dust and the methods of dealing with dust nuisances, after which living organic dust—the bacteriology of the air, in fact—is considered in the final thirteen pages. The variation according to season and altitude in these living forms of dust, the transmission of diseases through the agency of the air, and the natural means of purification by time, drying, and by the sun's light, are all briefly considered, so that the article is one which treats systematically of a subject which has hitherto been but scantily dealt with in text-books.

M. Leisieur's article on climatology is necessarily too brief to include more than a bare sketch of his subject, and so wisely devotes most attention to temperate European climates, but some notice of hot and cold climates is also included, and the last five pages are devoted to the question of adaptation to climate.

Correspondence.

THE REVIEW OF HUGGARD'S HANDBOOK OF CLIMATIC TREATMENT.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS.—Not until two or three days ago did I see your issue of February 15th, in which you courteously inserted my letter criticising your Reviewer's notice of my book. But by printers' errors in the placing and in the omitting of quotation marks, I am made to adopt the Reviewer's standpoint.

In these circumstances I beg permission once more, and finally, so far as I am concerned, to place the point at issue before your readers.

According to my exposition the comparative coldness of the upper layers of the atmosphere is mainly due to the physical laws of the expansion of gases, a body of doctrine as fundamental in modern meteorology as is the doctrine of gravitation in astronomy. But according to your Reviewer "this law explains only the rather exceptional case of up-hill winds." An exactly equivalent criticism in astronomy would be that the law of gravitation explains only the fall of apples. To the Reviewer's mind the true reason of the comparative coldness of the upper layers of the atmosphere is "the universal operation of the law of selective absorption."

In reply to my criticism your Reviewer quotes the first two paragraphs from Hann's Exposition of the Causes of the Vertical Decrease of Temperature, in which Hann points out "that the storage of heat at the bottom of the atmosphere results from the peculiar behaviour of this atmosphere towards solar radiation. This process has been called *selective absorption*."

That the special storage of heat in the lower layers of the atmosphere accounts for the comparative coldness of the upper layers may be claimed by your Reviewer as a discovery of his own. At any rate this explanation does not appear to have struck Hann, who, a page or two after your Reviewer's quotation (*Handbuch der Klimatologie*, 2nd ed., 1897, vol. i., p. 264), continues as follows:—

"Therefore the general law holds good: Ascending masses of air cool at the rate of 1° C. for each 100 metres of elevation, so long as no condensation of water vapour takes place; conversely, descending masses of air become warm at the same rate.

"If we imagine the air masses of the atmosphere so thoroughly mixed in a vertical direction that every particle of air had several times passed through the whole height of the atmosphere, the fall of temperature would then be found to be 1° C. for each 100 metres of height. At this rate of decrease of temperature a rising or a falling mass of air would, at each level, encounter its own temperature, that is to say, it would in each level be in equilibrium, having no tendency to rise or to fall. This is the condition of indifference (convective) equilibrium."

That the actual rate of cooling in the lower layers of the atmosphere is much less rapid than theory would lead us to expect is explained partly by selective absorption and partly by the heat set free through the condensation of moisture.

In his *Lehrbuch der Meteorologie*, 1901, p. 161, Hann says: "The more recent balloon journeys have shown in fact at heights over 6 to 8 kilometres a fall in temperature of 0.8-0.9° C. per 100 metres; and this proves that at

these heights vertical movements of the air must be very frequent, since they almost determine the temperature of these high layers.

Thanking you in advance.

I have the honour to be, Sirs,

Your obedient servant,

WILLIAM R. HUGGARD.

Davos-Platz, March 23rd, 1906.

[At the urgent request of Dr. Huggard we departed from the general rule of all publications, scientific or otherwise, that a reviewer's comments are privileged.

At first sight this rule might appear to be unfair to the reviewed, but it is obvious that but for its existence, either reviewing would fall to the level of uniform inane compliment, or much of the space of periodicals would be occupied with discussions interesting only to the combatants concerned. We therefore propose to adhere rigidly in the future to the wholesome general rule, and if any author is not prepared to accept our review of his work, for what it may be worth there is no need for him to forward it for review.

The present instance is a good case in point, as it has involved printing long extracts from a standard work accessible to everyone. Both reviewed and reviewer, of course, are perfectly aware of the rudimentary fact that gases get hot when compressed, and cool when they expand, but if this determined the temperature gradient for different elevations the fall of temperature in ascending would be much more rapid than it is, and the actual usual gradient is determined by the action of selective absorption. We have equally no doubt that Dr. Huggard thoroughly understands this, but he has failed to make it clear in the book reviewed, in which "selective absorption" is not even mentioned in the index. It is not enough, however, for an author to understand his subject, as he fails in his object unless he succeeds in making others do so. This discussion must now be closed.—Ed. J. T. M.]

PLAGUE AND FLEAS.

THE Indian Plague Commission are said to have definitely proved that rat fleas are the normal vehicles of infection in animals, and probably in man. This has been arrived at by shewing that animals protected by fine wire gauze remain immune in plague-infected buildings, while unguarded controls contract the disease in large numbers. Although Ogata as far back as 1897 shewed that the titurated fleas of rats were infective, the theory of insect transmission has been generally "pooh-poohed," and much of the credit of bringing the matter again to the fore is undoubtedly due to Capt. Glen Liston, I.M.S., whose paper in the *Indian Medical Gazette*, of February, 1905, may certainly be considered the new starting point of the now triumphant theory.

Notes and News.

METEOROLOGICAL stations are to be instituted under the Indian Meteorological Department at Pharo and Gyantse in Tibet, and as these are our only present stations beyond the Himalayan watershed, the gain to meteorological science can hardly fail to be of the first importance, especially in connection with the supposed relationship between the snowfall of Central Asia and the intensity of the south-west monsoon.

MR. HUGH CLEMENTS' FORECAST FOR THE SOUTH-WEST MONSOON OF 1906.

Omitting a number of illustrations of the infallibility of his methods based on the weather in Bombay, we reproduce from the columns of our contemporary, the *Allahabad Pioneer*, the following letter on the forthcoming monsoon:—

"The south-west Indian monsoon is not a magnified land and sea breeze, as stated in all pseudo-scientific works, but is caused by the tidal action of the moon and the sun forming depressions to the north of India, towards which the air from the Indian Ocean is drawn by the great inequality in the barometric pressure.

"From the position of the moon and the sun at any moment I am enabled to localise the depressed area all over the world, and thus predict unsettled and wet weather. For each place there are certain lunar and solar celestial positions correlated with periods of depression and rainfall.

"In accordance with my calculations of the height of the barometer and rainfall for each day, may I venture to predict that the south-west monsoon will break on May 16th, 1906, and continue off and on till August 13th? There will be some rain again after the first week in September and at the end of August.

"It will be windy round the British coasts on January 3rd, 11th, 22nd, and 29th, 1906.

"A. My prediction of mild and cold periods from November 21st has been amply verified.

"B. The *Daily News* of December 21st, 1905, contained my Christmas forecast, and proved accurate in every detail.

"HUGH CLEMENTS.

"Newton House, Burry Road,

"Dulwich, S.E.,

"December 31st, 1905."

The above extracts may be of interest to such of our readers as reside within the limits influenced by the south-west monsoon, especially as by the time this issue reaches India the performance of the monsoon of 1906 will be "just going to begin," and they will be able to compare the actual facts of Nature with the predictions of the prophet. The objections held by ordinary students of meteorological science to Mr. Clements' theories are sufficiently obvious, and are based on the facts that in the first place, although an atmospheric tide undoubtedly exists, the wave so produced is so feeble that it can only with difficulty be recognised in barometric records; and again, it is difficult to see how a series of phenomena regularly recurring every lunar month can account for a seasonal phenomena lasting some five or six of these periods. Oceanic tides can be foretold with a mathematical certainty which was recognised in proverbial folk-lore long before the facts had been reduced to tabular statement; but quite the reverse is the case with the south-west monsoon, which has hitherto defied the efforts of the scientific weather forecaster in a manner that has led the Indian public to regard his predictions with rather more amusement than confidence.

Of course, the official meteorologists would be the

first to admit the inadequacy of our present knowledge and means; but even if Mr. Clements chances to hit the mark on the present occasion, it would require several years of success to convince those who have most deeply studied the question to look upon a successful guess as other than a coincidence.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Journ. Roy. Met. Society," 1906, p. 21.

GENERAL FEATURES OF THE PRESSURE AND WIND CONDITIONS OVER THE TRADES-MONSOON AREA.

Dallas, W. L., epitomises the results of ten years observations from ships' logs, and land stations, recently collated by the Indian Meteorological Department, within an area of 32° N. to 12° S. and 40°-140° E.

These show that, taking the whole area, pressure is highest in January and lowest in July, while the wind is strongest in the latter month; but shows, unlike the pressure, not a single maximum in January, but double minima about March and October.

The apparent discrepancy is due to the undue preponderance of the northern latitudes, and the contrast in the distribution of sea and land of the belts north and south of the line. Even, however, if two 4° belts N. and S. of the equator be taken; the double oscillation, corresponding to the position of the vertical sun is very ill-defined, and moreover, in both zones, there occurs a minimum in April but there is none to correspond with it in October, nor do the pressure maxima occur at the solstices.

The pressure changes from month to month are much less symmetrical than might be expected. They are smallest at the two solstices, when the sun remains practically stationary over lat. 21° for two months, and largest between May to June and September to October, as a result of the large temperature changes then occurring over the large land surfaces of Southern Asia.

The distribution of pressure in each month in the included area is then discussed, but these are best studied in the appended graphic representation.

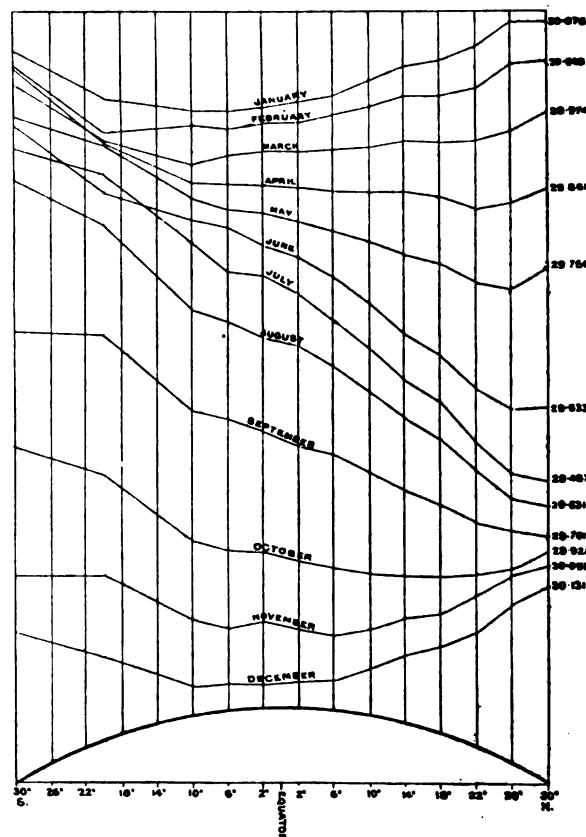
It will be observed that the pressure changes lag a great deal behind the sun. In spring and autumn the curves are saucer-shaped, the lowest pressures being between the equator and 10° S., and as a result, the winds north of this area have a marked northerly component, and those south of it a southerly; but in April the distribution changes, and there comes into existence a steady decrease of pressure from lat. 30° S. to 22° N., while the high pressure area in 30° N. is very slight and unimportant. From May to August these changes are maintained and intensified, there being a steady gradient from 30° S. to 30° N., which is at its steepest in July, when it amounts to nearly three-quarters of an inch of mercury, but there is a smaller second maximum of a quarter of an inch in December, with interposed minima in February and November, when the range of gradient is no more than 1.7 inch. The calms of these latter months and the strong winds of February are easily understood by following the curves for each month.

The most important point in the paper, however, is that the author quite rejects the old theory that dominates many of the past official memoirs of the Indian Meteorological Department.

These were to the effect that the monsoon current is due to an impulse in one spot, like a jet of steam issuing from a

closed reservoir. For example, in a *Memorandum*, written in 1891, these views are stated as follows:—

"Hence the advance or extension (or burst of the moonsoon) takes place from South to North, and therefore cannot be explained as a mere indraught to a hot area. The phenomena rather indicates that there is a vast resistance to be overcome, and that when this is effected by a force from the rear, the massive current moves forward and invades India."



By means of a table showing the barometric gradients from zone to zone, and the mean wind force, the author shows that the observations discussed afford no evidence of any such "tempestuous obstacle overcoming onslaught," and that "a general agreement between the pressure differences and the mean force of the wind obtains throughout the whole area and throughout the whole monsoon period, and the velocity and strength of the winds of the circulation appears to be regulated by the ordinary rules of the differences of barometric gradient, and not, at any time, by a single impulse imported to the rear of the aerial current."

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Original Communications.

NOTE ON THE *TINEA IMBRICATA* IN BRAZIL.

By ULYSSES PARANHOS, M.D.

Assistant in the Pasteur Institute; Physician to the Charity Hospital; and

CARAMURIE PAES LEME, M.D.

Director of the Laboratory of the Chemical Institute of São Paulo.

THE first cases of *Tinea imbricata* recognised in Brazil were observed by one of us during a scientific excursion ordered by the Government of São Paulo in Brazil. The first case which, by its evident symptomatology, induced us to make the diagnosis of *Tinea imbricata* was observed in a native of the Carajás tribe inhabiting one of the islands of the River Araguaya in the State of Goyaz.

Among the Carajás *Tinea imbricata* is very common. They call it "roôro," which, in their language, means "the flying disease," because they think that hostile tribes blow it in the direction of their huts to cause them harm.

The natives of Brazil generally employ for the cure of this illness the bark of the root of *pinjossara*, which is no other than the plant called *Ocailia perdiceps* of Baill.

One of us was present at the moment of this application for the treatment of the *Tinea imbricata* among the indigenes, which, on account of its great originality, deserves to be mentioned.

The bark of the root of the *Ocailia perdiceps* is placed in maceration in cold water. On the following day the patient undergoes the application of this medicine, which consists in friction over the whole body with the macerated bark, after which the patient is exposed during half an hour to the action of the sun's rays, and washed afterwards in cold running water, his skin being then rubbed all over with the ashes of the same plant.

The consequences of this treatment are not long in appearing; the skin becomes reddish, being formerly of a bronze colour; the patient becomes agitated, the temperature rises, and sometimes delirium is observed, which often reaches frightful proportions. This state of things lasts from four to six hours. Sleep comes on, and on the following day the patient awakes quite calm, his general condition is good, and the appearance of his skin visibly modified, the large scales fall off, a slight glossy scaling being then observed.

On the third day after this application the same treatment is repeated, but then the reaction of the organism is weaker.

The treatment is thus continued every three days till the complete recovery of the patient. The reaction of the patient always preserves an inverse proportion to the number of applications.

The positive result of this native treatment, though empiric and excessively violent, is undeniable. The treatment of the native Curicy, the first patient whom we observed and a typical case of *Tinea imbricata*, proves it thoroughly.

Submitting himself to the indigenous treatment, he recovered in our presence from his illness, which did not repeat itself, as the man accompanied our scientific excursion as far as the State of Para, returning in our company to São Paulo without the least sign of re-appearance of his dermatosis.

Tinea imbricata exists in Brazil, as we have observed personally, in the States of Goyaz, Matto Grosso, Minas Geraes, and São Paulo.

In the State of Goyaz it rages along the banks of the River Araguaya; in Minas Geraes it exists in the city of Uberaba and its neighbourhood, and in Matto Grosso among the natives on the left bank of the Araguaya.

In the State of São Paulo, where we have better observed it, *Tinea imbricata* is found on the banks of the River Pardo in Yardinopolis, Sarandy, Visconde, Coronel Orlando, and in the populous city of Batalaes.

Tinea imbricata in Brazil attacks every race. We had opportunities of observing it in individuals of the yellow race, in natives, among the white people, and negroes. Age and sex have no influence whatever upon it. Among our observations cases occurred at the ages between 12 and 50, and the prevalence in either sex is not remarkable.

Social position presents no difference in liability; we have observed the disease in individuals belonging to the lowest class of society, but, on the other hand, we have also seen patients who belonged to the highest ranks, living with all comfort and having the best hygienic conditions.

The disease in Brazil presents itself in the classical manner so accurately described by Sir Patrick Manson in his valuable works on the subject. The disposition of the scales of the skin as a collar, their position resembling that of the tiles on a roof, is quite accurate.

On examining our patients we have always found the parasite described by Tribondeau. For the recognition of the parasite the following process may be employed.

The scales of *Tinea imbricata* are treated by alcohol at 40° for five minutes, and afterwards with sulphuric ether in a test tube, which should be shaken several times. After having washed the scales with sulphuric ether, treat them with a solution of potassium in distilled water in the proportion of 10 per cent., keeping them in that solution until they are disintegrated.

The scales are then washed several times with distilled water, being left in that liquid for some time to entirely free them from the excess of potassium.

After this nothing more is needed except to spread the scale on a slide, which, under the microscope, presents the *leptophyton* much more transparent and hyaline than the cellular elements. The scale being separated by the process we have described, and the preparation being fixed *a calore*, we can stain it.

The colouring substances employed are any of the aniline stains.

After having coloured the preparation, we wash it with alcohol and distilled water, examining it immediately with the microscope. One of us, in the researches made in the Pasteur Institute of São Paulo, obtained good results with the method of double colouring advised by Jeanselme. Having fixed the

scales of the *Tinea imbricata* by ethylic alcohol and crystallisable acetic acid, the preparation being free from all greasy substance, is plunged for twenty seconds in a solution of 1 in 100 of eosine orange, and afterwards discoloured by means of a few drops of alcohol at 60°; the preparation is then plunged for one minute in an aqueous solution of toluidin blue of 1 in 100 and discoloured once more by means of alcohol till the scale gets a clear colouring, after which the preparation is clarified by means of xylol and examined microscopically.

On the specimens coloured by the Jeanselme process one can see the mycelium filaments of the parasites clearly stained in dark blue on the epidermic cellular elements, coloured yellowish-red.

Superior to the method of Jeanselme, just described, is the following, mentioned by one of us in the JOURNAL OF TROPICAL MEDICINE, of December, 1905.

This method consists in washing the suspected scale in winter-green essence and Roux mixture; in its disassociation in an ammoniacal solution of 30 per cent., and its colouring by means of lithined aniline blue prepared by a special process. The preparations obtained by this method have a rare precision and show the presence of the parasites, even if these are in minute numbers. They are superior to the methods of colouring in toluidin blue (Jeanselme), or eosined alcohol (Besson), or vesuvine (Trebondeau) and safranine (F. Noe).

In our researches we have always observed, as already stated, the parasite of Trebondeau. The constituent elements are ramified and in great number; each one of them is formed of cubic or rectangular articulations of various sizes. Where the ramifications can be described the mycelium elements present a single body resembling the letter T or Y.

We have investigated with the greatest care to ascertain the starting point of the *Tinea imbricata* in Brazil, but, unfortunately, all our researches have been failures. It is a current opinion among people inhabiting the infested localities that the *Tinea imbricata* is derived from water, and shows itself in persons who bathe in the rivers. All that is but a supposition; it is, however, convenient to observe that the disease has its principal centres in villages situated on the banks of rivers.

One of us has devoted himself to investigations so as to know how far the popular idea regarding the diffusing of the *Tinea imbricata* through river bathing is true, but nothing has been proved up to the present respecting the subject.

Tinea imbricata is, in our opinion, increasing in Brazil. The fact of its being unknown up to a short time ago denotes it was rare in past periods. It used to attack only the natives, or persons inhabiting those places where physicians were not to be found who were acquainted with tropical dermatology, and who did not make the true diagnosis of the illness. Actually it is quite different, because the disease exists in the populous centres where its greater diffusion is readily understood.

We have tried, on our patients suffering from *Tinea imbricata*, most of the forms of treatment advised.

We have obtained good results by the application of wet boric compresses, followed by friction with

black soap and the use of Goa powder, advised by Branel.

The application of an iodine liniment recommended by Patrick Manson has benefited some patients; but what has given the best results, in our cases, is the bark of *Ocalia Perdiceps* adopted in the indigenous method.

The general lines of our method are: (1) A general tepid bath with an alkaline solution of one kilogramme of sodium acid carbonate diluted in twenty litres of water. (2) A lotion with the following mixture: Bark of *Ocalia perdiceps*, 50 grammes; glacial acetic acid, 15 grammes; glycerinated water (10 per cent.), 985 grammes; let the whole macerate during two days and then filter. We employ, before making use of this medicine, an alkaline solution to soften the scales and thus facilitate the introduction of the parasiticide medicine to the cellular elements. During this treatment we recommend to the patient a liberal regimen. We add also to this, tonic remedies such as iron, arsenic and strychnine. With this treatment the results obtained are quite encouraging.

MOSQUITO NOTES.

By Lieut.-Colonel G. M. GILES, I.M.S. (Retl.).

I.—NOTE ON A SMALL COLLECTION OF MOSQUITOES FROM BARHAIN IN NORTHERN ARABIA (SHORES OF PERSIAN GULF).

It is a curious coincidence that an incidental remark on the scantiness of our knowledge of the mosquitoes of the Arabian peninsula in our last issue had hardly gone to the press, when I received from Dr. A. Bennett one of my collecting boxes with a small collection of mosquitoes from the Island of Barhain.

Unfortunately, too many specimens had been crowded into the box, so that some have suffered a good deal in transit, and it is possible that it may include more species than those enumerated below.

It includes only one specimen of the Anophelinæ, a female *Nyssorhynchus metaboles* (Theobald), rather darker than most of the specimens in the British Museum collection, but this is probably the result of rubbing.

There are a number of specimens of a *Mansonia*, which represent, I fear, a new species.

Of the ten specimens, eight are males and two females.

Mansonia Arabica, sp. n.—Wings unspotted, but brindled; clothed with large broad scales, many having the characteristic "bracket" form; these are mingled white and black, the former largely preponderating; fringe scales entirely white.

Thorax dark brown grounded, clothed with white ferruginous and almost black curved scales, which very probably produce a definite ornamentation which appears to reproduce the two pale stripes of *Mansonia dorsalis* (Meig.).

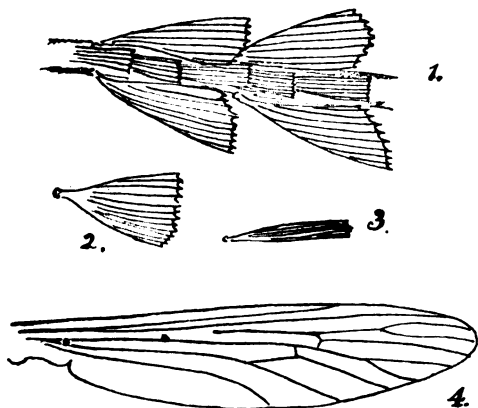
Abdomen generally pale, clothed with a mixture of white, with a few ferruginous scales, the former form-

ing an almost pure white median line, while the latter are mainly confined to the sides. In addition, there are on all but the last segments a pair of L-shaped dark brown spots, the horizontal limbs of which form an apical dark border to the segments, interrupted by the median white line.

Legs brindled, with black, white, and ferruginous scales, giving a generally rather dark effect, with snowy knee spots, and three fairly broad, articular, ferruginous bands on the tarsi (rather variable).

Proboscis dark at the tip and absolute base, and quite pale in the middle, but still not definitely banded.

Head mainly covered with white, forked scales. Antennæ of ♂ ferruginous, of ♀ with almost white plumes. Palpi of ♂ almost white, with darker spots



Mansonia arabica. (1) Portion of 1st longitudinal vein. (2) A broad scale from one of the hinder veins. (3) Lateral scale from anterior fork. (4) Venation.

at the joints and in middle of the long second joint; of ♀, dark brown. Scutellum with white and ferruginous scales; pleura ferruginous, with some white tufts; venter mainly white scaled; sides of abdomen densely fringed with long brown hairs. A fairly large mosquito.

The female has a median, ferruginous abdominal stripe, and the L-shaped spots so large as to be almost continuous laterally, and in both the marking is generally darker than in the male.

In Mr. Theobald's classification I conclude that this species would be placed as a *Grabhamia*, as it is strikingly like our English species *dorsalis*, which is included by Mr. Theobald in that genus. In the ♀ the resemblance is specially close. I confess, however, that I am unable to distinguish the limitations of *Grabhamia*, as the distinction between it and his *Teniorrhynchus* on the one hand, and *Mansonia* on the other, do not appear to be quite apparent.

The genus *Mansonia*, if not too rigidly defined, is quite a natural one; and as regards the wing, the definition I should prefer would be that the veins should be prominently, but not necessarily, entirely clothed with large broad scales. This would admit of the inclusion of a considerable number of species, such as *fasciolatus*, which Mr. Theobald places in *Teniorrhynchus*. The asymmetry of the so-called bracket scales is in most cases more apparent than real, and is more commonly an effect of perspective. It is

erroneous, too, to assert that in any *Mansonia* there are no median scales, as stated in Mr. Theobald's definition of his genus. Unrubbed specimens must, of course, be selected, but what is actually the case is that in the more typical species the median as well as the lateral scales have assumed the peculiar broad form.

In the present species this is only commencing, though when separate and flattened out, the median scales are considerably wider than they appear in the *camera lucida* outline of the figure. Another character of the genus is that the species are brindled, with mixed scales of contrasting colours, not only on the wings, but more or less over the entire body, and especially on the legs.

A somewhat striking character of the venation of the present species is the exceptional shortness of both the fork-cells.

The two remaining species included in the collection are almost cosmopolitan, for the warmer parts of the world, being:—

(2) *Stegomyia fasciata*, Fabr. Ten specimens, all but two of which are females.

(3) *Culex fatigans*, Wied. Twelve specimens, eight of which are females and four males.

II.—Dr. Adolf Eysell kindly sends me a reprint of the forty-ninth report of the Natural History Clubs of Cassell, entitled, "Sind die Culiciden eine Familie?" (Are the *Culicidae* a Single Family?). He first takes up the consideration of the genera *Corethra* and *Mochloryx*, which are now usually placed as a sub-family (the *Corethrinae*) of the *Culicidae*, and gives excellent reasons for deprecating their inclusion with the true gnats, with which probably most naturalists who have studied these insects will agree. It may be remarked that it was only after considerable hesitation that I decided to include descriptions of these insects in my "Handbook of the Gnats or Mosquitoes," and I believe that Mr. Theobald felt a similar hesitation when preparing his monograph.

Our ultimate decision to do so I personally regard as a mistake, which unnecessarily extended the scope of our books. These insects, in fact, are not gnats at all, their mouth-parts differing entirely from the piercing apparatus of those insects, and should really be considered midges with a wing venation that chances to resemble that of the *Culicidae*.

Possibly this is a case of mimicry, though, as is often the case, it is difficult to see what advantage accrues to the midge from its resemblance to the gnats. His proposal, however, to promote the *Corethrinae* into a distinct family, instead of transferring them to the *Chironomidae*, may not, however, command such general approval, and still more his proposal to adopt the same course with regard to the *Anophelinae*, for if, apart from the *Anophelinae*, the *Culicidae* are not a single family, and, it may be added, a remarkably natural one, it is difficult to understand what constitutes family resemblance.

It is perhaps only a natural evolution of the process which is rapidly reducing our conception of genus to the level of species, and each naturalist's decision must depend on his conception of the limits of these extremely elastic and ill-defined terms. It is obvious, however, that it only requires a sufficient extension of

the process to leave each species in a separate class of animated Nature by itself, and then I suppose we should have to start off again with the process of sorting it by instituting generoids, familoids, or some such nomenclature.

He has also been good enough to send me a reprint of his articles on the mosquitoes in Dr. C. Mense's "Handbuch der Tropenkrankheiten," which gives in comparatively short compass a thoroughly up-to-date epitome of the morphology of the family, methods of dissection, collection, preservation, general principles of classification, &c., as well as a short account of the life-history of the malarial parasite. It is well and liberally illustrated, though some of the photographs are not quite as convincing as might be desired, and certainly in some cases might advantageously be replaced by drawings.

"Centralblatt für Bakteriologie Parasitenkunde und Infektionskrankheiten," xxxix., p. 280.

SCHISTOSOMUM JAPONICUM.

Looss shows that *Schistosomum Cattoi*, Catto, 1905, is only a synonym for *S. Japonicum*, Katsurada (1904); the employment of the newer name (*S. Cattoi*) should therefore be dropped, and the older be always employed in speaking of this parasite.

"Journal of Infect. Dis.," 1905, p. 577.

It is well known that plague bacilli are occasionally met with enclosed in a capsule, and W. B. Wherry has met with the same peculiarity in a cocco-bacillus isolated from the liver of a plague rat. The oval capsule stained red with Romanowski; and cultivations answered to all the ordinary tests of *B. pestis*.

"Archives de Zoologic. Exper.," 1905, p. 101.

RESEARCHES ON THE HAPLOSPORIDIÆ.

Caullery, M., and Mesnil, F. The haplosporids are an order instituted by the authors in 1899. They are sporozoa allied to the microsporidia, but with quite different spores. These are always mononuclear, with large, easily demonstrated nuclei, and the cell plasma quite undifferentiated, and with no trace of polar capsule.

The authors have combined their own work with that of others on similar types, and propose the following classifications.

They divide the order into three families:—

(1) *Haplosporidiidæ*. Spores with double envelopes, the inner denser and furnished with an opening, closed by a valve in *Haplosporidium*, or open in *Urosporidium*, in which it also has a long tail-like process and a lateral wing. Parasitic in annelids.

(2) *Bertramiidæ*. Spore envelopes without opening. Genus *Bertramia* and probably *Ichthyosporidium*, one of the species of which inhabits the stomachs, and the other causes large tumours in certain fishes, but is as yet insufficiently known to be definitely placed.

(3) *Celosporidiidæ*, in which the entire parasite encloses in a dense membrane, while the mononuclear spores developed within it remain nude. It includes, besides the type genus, *Polagcaryum*, Sternbell, and *Blastulidium*, Perez.

The authors enumerate many other genera which they believe come within the order, and believe that the *Haplosporidiæ* are nearest to the *Sarcosporidiæ*, but approach also the *Microsporids* and *Rhizopods*, and perhaps to the lower fungi, such as the *Chytridinae*. The human parasite recently described in a nasal polypus by Minchin and Fantham, it will be noted, is a *Haplosporid*.

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THE

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MAY 1, 1906.

IS MALARIA AS BLACK AS IT IS PAINTED?

THERE is an old tale, anent one of the old Georgian medical worthies—Abernethy, if memory serves us aright—that when posed by any difficult complication, he was accustomed to declare that "it was all gout." Nor, if we may judge from the writings of Haig and his school, is the doctrine by any means dead; for, indeed, the tendency of specialists generally to claim all disease as their own is proverbial.

For tropical countries malaria has, in this respect, always taken the place occupied by gout in temperate climates. Long before Laveran discovered the malaria parasite, the verdict of the tropical physician has generally been "it is all malaria," and the prominence that disease has recently attained as the pioneer of our knowledge of human protozoal disease has only added to its pre-eminence in this respect.

We have always been familiar with such terms as malarial rheumatism, malarial iritis, phlebitis, and what not, but it is tolerably certain that had these cases presented themselves to a European physician, suffering from what may be called the gouty bias, his diagnosis would have differed from that of his tropical colleague only in the substitution of the word "gouty" for "malarial."

Analysing the reports of such cases, we generally find that, beyond coincidence, the evidence in favour of the need of any qualifying word to that specifying the disease is remarkably scanty.

The maladies so described are usually of a sort that are rarely fatal, and even in cases that prove so, no evidence whatever is adduced to show that the malarial parasite is in any way responsible for the lesions recorded.

Take the case of "malarial" rheumatism: to the uninitiated they would appear mere ordinary cases of lumbago, sciatica, pleurodynia, and so on, such as are met with in all parts of the world.

The etiology, almost universally accepted elsewhere, is that they are due to the sudden chilling of the affected part, which brings about a congestion of the little sensory nerve bulbs that are scattered between the fibres of muscles, and especially amongst those of their tendinous insertions.

The reduction of temperature which thus irritates these very delicate structures is usually sharp, but of short duration, and leaves no visible impression on the surrounding structures, and as there has been no general chill, the patient, apart from his muscular pains, is little the worse, and shows no constitutional symptoms whatever. If resident in a hot country, he, doubtless, has suffered more or less from malaria, and may be debilitated from the strain of prolonged residence in a tropical climate, and these drawbacks may, no doubt, render him less capable of withstanding chills and other accidents, but this does not give us the right to regard his symptoms as a special and distinct variety of the disease from which he is suffering, still less to reduce the latter to the position of a mere symptom, indicative of malarial poisoning. Are we really to suppose that because a case of muscular rheumatism, occurring in a hot climate, may happen to have had one or more "touches of fever," his system is so "saturated with malaria" that the capillaries supplying the end bulb of the afferent nerves from his muscles are choked with parasites, or what are we to believe? Muscular rheumatism is very common in hot countries, because they have just the climates which most expose people to sudden chills. What need, then, is there of dragging malaria into the question?

Direct and obvious complications and sequelæ of really severe malarial infection belong to quite a different category, and are not the class of case we are considering. It is the subtle workings of "latent malaria" with which we are now concerned.

Another and more significant question, the importance of which is steadily forcing itself upon our attention is: How much of what we have been accustomed, clinically, to regard as malaria, is really of that nature?

For many years after Laveran made his great discovery our instruments and methods were so defective that but few succeeded in convincing themselves of its validity, and even after we had reached the stage of conviction, born of seeing undoubted parasites in fortunate preparations, our successes were usually so few, in proportion to our failures, that no one dreamed of regarding a negative result as in any way conclusive of the absence of malaria.

Fresh blood in a tropical climate is one of the most unstable of tissues, and with the utmost care to secure uniformity of method, two films from the same drop-let of blood often present *post-mortem* changes of so

different a description as to render any comparison obviously untenable. Under such circumstances what was to be read as an abnormality due to the presence of parasites, and what a fallacy due to *post-mortem* changes?

At this time malaria was, for us, like the first French Republic, "one and indivisible," and the puzzle was made all the worse by our meeting consecutively with different species of the parasite.

For these various reasons, the profession, even when convinced of the truth of Laveran's discovery, was, for purposes of diagnosis, generally driven back on the "clinical method." If one found parasites, well and good, the case was undoubtedly malarial; if not, it might, or might not be so, but few would reject the diagnosis on the strength of mere failure to find parasites.

With improvement in the methods of making and staining blood films, the physical diagnosis of malaria has become a comparatively easy matter, but there is still considerable reluctance to rely on the absence of parasites for a negative diagnosis, even after repeated examinations.

As recently as 1904, Powell, of Bombay, in the *Indian Medical Gazette*, 1904, p. 41, reporting on the examination of 3,413 cases of fever, found parasites present in 2,542 cases, and adds that, "of the remaining 761 cases, a definite diagnosis by clinical methods was made in 531, leaving 214 cases of fever whose cause is uncertain." Here, then, are at least this number of cases of indeterminate fever, which only a few years ago would undoubtedly have been ascribed to malaria; but what of the 531 cases diagnosed by "clinical methods," and what real ground is there for assuming them to be malaria at all?

Nothing more than that the general symptoms corresponded with one or other type of the very large group of feverish cases, which we were accustomed to diagnose as malarial in the days before we had any physical means of discrimination to rely on.

Added to this, it is now well established that, especially in children, malarial parasites may be present in the peripheral circulation, without producing any rise of temperature or other overt symptoms of ague; so that it does not absolutely follow that a fever is entirely, or even mainly, due to malaria because the parasites of that disease can be demonstrated in the blood. Everyone of any extended tropical experience well knows that malaria often shows itself as an awkward complication of any condition, whether morbid or traumatic, that throws a severe strain on the organism. This is notably the case in some epidemics of pneumonia on the very malarious Punjab frontier, where the coincidence of the two infections may be so general as to be almost the rule. That the added weight of the malarial recrudescence is far from improving the patient's chances goes without saying, but still, one does not regard the case as other than one of pneumonia, nor would it be fair to do so; and yet one might easily conceive the advancement of the thesis that the epidemic was one of "malarial" pneumonia, and not merely of pneumonia with more or less common malarial complication.

Another point that presents itself is the comparative rarity of serious cases of malaria in ordinary

tropical practice. Far more than nine-tenths of those met with are what are commonly spoken of as "touches of fever," lasting from a day to a week, or even more. Most of these are undoubtedly malarial, the parasites, usually of the "aëstivo-autumnal" type, presenting themselves at the correct period, and disappearing coincidentally with recovery. They are, moreover, mostly fairly amenable to quinine. Every now and again, however, a severe prolonged case of fever presents itself, in which quinine has no effect whatever. In the early stage, before the patient has been saturated with quinine, parasites may have been recognised in the blood, or they may not, and the case is diagnosed as malaria "by clinical methods"; but apart from customary habits of thought, what better ground is there for regarding the prolonged pyrexia as due to malaria, than in the case of pneumonia, with malarial complication.

So obvious is the fact that the vast majority of cases of malaria are of a very trifling character, that in the days before agglutination tests released us from so many perplexities, the diagnosis of malaria in the case of serious illness in a European was officially regarded in India with considerable suspicion, and it was considered as almost axiomatic that such cases must be referable to typhoid fever.

The mildness of the majority of attacks is equally proverbial in Africa, and the question naturally arises whether the serious fevers, occasionally epidemic in India, and the even more serious, but usually quite different, blackwater, and fulminating hyperpyrexia of Africa, have really any causation in common with the mild disease with which we are so familiar.

It is most significant that the severe fevers of India are usually quite different from the serious African fevers, for though hæmoglobinuria is occasionally met with in the former country, such cases, apart from this symptom, are far from otherwise presenting the clinical picture of blackwater fever.

It is notorious that malarial parasites are often conspicuous by their absence in that disease, and it must be repeated that their occasional association with the conditions above indicated definitely proves nothing more than complication; for if the discovery of parasites be equivalent to proof of malarial causation, then amputation of the leg and child-birth must often own a similar etiology.

Gradually, too, the origin of some of these indeterminate fevers is being elucidated. The final demonstration of the presence of Malta fever in India, noticed in a recent issue, accounts for a certain percentage of the serious cases that for want of a better diagnosis were mistaken for obstinately recurrent malaria. It is noteworthy that Bentley, of Assam, in the *Indian Medical Gazette*, 1902, p. 337, advanced the theory that kala-azar is really Malta fever, and his opinion was confirmed by Major D. Semple, of the Kassauli Pasteur Institute, by means of the agglutination test.

"Kala-azar" is always the malady that happens, for the time, to be in fashion, the native words really referring to any serious chronic malady, but it is clear that some of the cases, so-called, must be Malta fever, though the Leishman-Donovan parasite is now more in vogue, and doubtless does really account for a considerable number of the heterogeneous collection of

cases brought on for treatment as kala-azar. Not so long ago the very investigators who are now most eager to make Leishman-Donovan parasitism and kala-azar synonymous were equally insistent of the theory that it was uniformly malarious in its etiology. A considerable percentage of cases, so-called by the natives, undoubtedly are chronic malaria, but more undoubtedly are referable to a variety of other chronic tropical maladies.

In view of the fact that malaria has already been deprived of kala-azar, will it be at all surprising should blackwater fever, and many of the other serious conditions now thought to be malarial, share the same fate?

Again, scarcely a month passes without our meeting with notices of protozoal parasites which are not malarial in the strict sense of the term. For example, W. Leonard Braddon, in the *Indian Medical Gazette*, 1903, pp. 168, 213, 291, describes a "mycoid body found in the red corpuscles in a form of remittent fever, prevalent in the Malay States" (*vide* also the *JOURNAL OF TROPICAL MEDICINE*, November 15th, 1901). Again, Jennings, in conjunction with Prof. A. Lingard, describes in the *Indian Medical Gazette*, May, 1904, a form of fever associated with a parasite they believed to be a piroplasma, and which was prevalent at a season when Anopheletes are practically absent.

Jennings' human hæmatozoa may or may not be piroplasma, as Lingard's conclusions in particular appear to be doubtfully received by the majority of protozoologists, but there is no practical doubt of the actuality of the parasites observed by Major Jennings, or of the validity of his general arguments as to their non-malarial nature, for these cases of cold weather and dry season fever, associated with the colourless, non-pigmented parasites, have long been a puzzle to many Indian observers, though they have, of course, been generally regarded as representing some phase of the malarial organism.

It would be easy to prolong this list, but the object of this article is not to produce a bibliography of the subject, but to suggest a judicial frame of mind in our consideration of the numerous cases, slight and serious, in which, though no parasites are evident, or in which, if present, do not correspond with any accepted stage of the known species of malarial hæmatozoa, but in which we have hitherto been too ready to take refuge in the time-honoured old diagnosis of "it is all malaria."

The question is by no means purely academical, as it is well known that many of this class of fevers are rather harmed than benefited by quinine, and it is very desirable that we should be able to save the patient a needless course of the drug, by reaching some means of arriving at an early and definite diagnosis.

THE INDIAN MEDICAL GAZETTE ON "GROWSING."

THE current (April) number of the *Indian Medical Gazette* pays us the compliment of printing in *extenso* our leading article on some of the causes of dissatisfaction in the Indian Medical Service, which appeared in our issue of February 1st.

That the editor of our contemporary agrees to differ from us is only what might be expected, as the *Gazette* is a good deal more than less an official publication, which no officer on the active list would dream of using as a means of ventilating his grievances, and hence is in a bad position to know what are the genuine sentiments of the rank and file of the service whose lot is cast up country, far away from Calcutta and the knot of men who, whether by luck or good management, occupy still desirable appointments in the second city of the Empire. The editor does not understand how the figure of thirteen men passed over for promotion on account of age was arrived at, and probably his information as to the age of officers qualified for promotion by their position on the list is more exact and up to date than ours, but for the purposes of our argument it matters nothing whether the accurate figures be 13 or 15 or 9. He admits that four men who were regarded as "in the running" were so passed over.

The gist of our complaint is that the Indian Government has hitherto given but scant encouragement to original research, and that the present rules as to superannuation bear hardly on men who have worked hard to specially qualify themselves for the service by taking house surgeoncies, honours examinations, and other post-graduate work.

With the above exception no attempt whatever is made to traverse the facts on which the complaints are based, though a lamely apologetic attempt is made to palliate them. Meanwhile, it remains an undoubted fact that no man who devotes really adequate time to his student career can reasonably expect promotion. As to the proposed remedies, opinions, of course, differ, as those who have been shrewd enough to enter young on a minimum qualification are naturally in favour of the existing state of things, but on the general indictment the writer of the *Gazette's* editorial is, so far, alone.

His contemptuous reference to officers who prefer to remain in military employ, whose fate, he says, is like to be "professional deterioration and finally, perhaps, supersession," appears to us to be, to say the least, in very doubtful taste, and will certainly not be relished by the very large section of the service so employed. He appears to forget that some one must perform the duties he so deeply despises, and that causes far other than laziness may determine an officer's preference for that branch of the service. As a matter of fact, however, a very fair share of promotion very properly falls to men on the military side, and though far from being enthusiastic admirers of the Indian Government's methods of dealing with its medical officers, we see no reasons for imputing to it the cynical injustice, implied in the editorial comment of our contemporary, of treating its military surgeons as an inferior and almost reprehensible body of men. He takes us to task also for failing to notice the hard case of the Sanitary Department, but all in good time. Pressure of space has prevented our returning to the subject during the last few issues, but we hope shortly to draw attention to a few other curled petals in the rose-bed of the Indian Medical Service.

ANÆMIA IN PORTO RICO.

A COMMISSION, consisting of Drs. Jgaravidez, King, and Bashford, has been engaged in the investigation of Porto Rican anæmia since March, 1904. The Commission has issued a preliminary report of the work accomplished from June 1st to November, 1905. In all, 18,865 patients were treated by consecutive doses (usually 5) of thymol, or beta-naphthol, for the expulsion of the *Ankylostomum duodenale* (uncinaria), with the result that the large majority were cured. The Commission finds that 99 per cent. of cases of uncinariasis contracted the disease by way of the skin; ground itch on the feet and ankle being the indication that infection has taken place. The prophylaxis of the disease is to be secured by making the wearing of shoes compulsory; by insisting upon all infected persons using a latrine; and by, if possible, causing all workers on the soil to wash their hands and clean their nails before eating. It is satisfactory to know that the Commission is to be continued, and that the good work already done may be hoped to be amplified and extended.

MALTA FEVER IN SHANGHAI.

By ARTHUR STANLEY, M.D., B.S.Lond., D.P.H.

Health Officer of Shanghai.

IN view of the Editorial in the JOURNAL OF TROPICAL MEDICINE of December 15th, 1905, which tends to show that Malta fever is rare elsewhere than in Malta, the following laboratory notes may serve a useful purpose: During 1904 nine specimens of blood from suspected cases of Malta fever were examined, and seven of these gave the Widal reaction with the Malta fever organism. During 1905, of twenty-seven specimens from suspected cases of Malta fever, ten gave the Malta fever reaction. The Malta fever organism used in the laboratory was obtained originally from the Lister Institute, and the dilution of the blood used for the test was never less than 1 in 50. The blood was furnished from cases in Shanghai and from the Yangtse ports. Clinically the cases were reported as corresponding to Malta fever. It is proposed to examine the specimens of blood giving negative results with the typhoid bacillus for the Malta fever reaction, as the type of cases reported as typhoid fever in Shanghai are so mild (case fatality 10·2), and show such a tendency to relapse as to suggest the possibility of some of the cases returned as typhoid fever being Malta fever.

[In consequence of the great pressure on our space, we have been compelled to omit the Colonial Reports from the present issue.—Ed. J.T.M.]

RHINO-PHARYNGEAL LESIONS IN YAWS.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—The excellent paper in your Journal of February 15th, 1906, from the pen of Dr. James Farquharson Leys, deals with a disease which was brought to the notice of the profession in my treatise on yaws, published in 1891. I was then of the opinion that the rhino-pharyngeal

lesions, which I described, were later manifestations of yaws, and, though I could not trace the connection between this disease and the symptoms so described with scientific conclusiveness, I remember that there was at the time no doubt in my mind of the relationship which I assigned to them, any more than there would have been as regards syphilis and similar manifestations of the latter affection.

Dr. Nicholls, in his "Report on Yaws in the West Indies," 1894, attributed these symptoms to tuberculosis, which, he said, was very prevalent in the district in which they occurred, but this is the only reason which he gives for considering them to be of tuberculous origin. As yaws, however, is far more prevalent there than tuberculosis, it would seem to me that the argument, based on coincident prevalence, would be far more in favour of a frambœsial than of a tuberculous origin. I am not aware that those who attribute these symptoms to syphilis adduce any better reason than the above in support of their theory. As Dr. Leys has pointed out, these lesions are met with in places in which syphilis is rarely seen or has never existed. Dr. Daniels encountered them in Fiji, where there is no syphilis, and he certainly had no reason to assign them to tuberculosis.

I wish to explain at this point that the destructive ulceration of the nose and palate which I attributed to yaws did not attack bone. In this fact there appears to be a difference between Dr. Leys' cases and mine. When I met with the only case in the district in which the bones of the nose and palate had been destroyed, I wrote to Mr. Hutchinson on the subject, requesting his opinion, and he assured me that his experience had led him to the conclusion that lupus could safely be excluded in such instances, as it never attacked bone, and that he considered the case to be one of syphilis. Dr. Nicholls refers to the same case in his report already alluded to as an example of syphilis in a yaws patient.

It would seem from Dr. Daniels' description of the nasopalatine symptoms which he observed in Fiji that the lesions in his cases were limited, as in mine, to a destructive ulceration of the soft tissues and that, in this respect, they also differ from the conditions mentioned by Dr. Leys, who states that "the disease begins in the soft parts, but after reaching the soft palate, and eating its way through its entire thickness, attacks the bone of the palate and nasal septum, finally destroying these entirely."

While in Dr. Leys' cases the destruction of tissue was so extensive as to attract the attention of a casual visitor, the noseless condition of the patient revealing his disease, in mine there was practically no outward manifestation of the affection.

I would not, however, conclude that the lesions in the patients in Guam had a different origin from those observed by me in Dominica, or by Dr. Daniels in Fiji. It is possible that the same cause, owing to peculiar conditions, had produced a severer form of the same disease in the first-mentioned place, whether the symptoms be those of a special local disease or a later manifestation or sequela of yaws. It would be strange if, supposing the symptoms to be those of a disease, *sui generis*, or rather of two different local special diseases, the lesions in one affection should be limited to the soft parts, and in the other should include both them and the bony structures.

Is there anything in European pathology which can guide us towards an opinion as to the nature of these symptoms? Certainly, considering the ages at which they appear and the absence of any evidence of hereditary syphilis, it is not at all probable that syphilis can account for them in the majority of the cases in which they are observed. Of the thirty cases seen by Dr. Leys during 1904, as many as seventeen were school children. On the other hand, similar lesions are sometimes the result of scrofulous influence. Cases have been reported in which an obstinate ulceration of the pharynx in scrofulous children has extended to the tissues of the soft and hard palate as well as to the nares, until the nose falls in and the greater portion of the soft and hard

palate are destroyed. Can the lesions under consideration have had a similar origin? The general condition of the patients so afflicted does not certainly suggest a scrofulous taint. "The patients," says Dr. Leys, "remain muscular, well fleshed, and well blooded," nor were there any signs of scrofula in those who came under my observation.

Dr. Leys very naturally points to the fact that these lesions have only been found in certain places and not in others in which yaws prevails as extensively, as a proof that they are not connected with yaws. He instances Nevis as a place in which yaws has been particularly prevalent for a number of years and in which such symptoms have never been observed. It is certainly the case that at the time I met Dr. Leys, I did not remember having met any case in Nevis in which there was any ulceration of the nose or palate. I have since then, however, found notes of three cases which have been under my care—patients aged 15, 17, and 19 respectively—in which the septum of the nose has been ulcerated, and a hole left in it the size of a sixpence. The mucuous membrane is studded with small encrusted tubercles. This condition, it will be urged, does not in any way resemble the severe destructive ulceration of the nose and palate which is under consideration. This is true; but may it not be a milder form of the same process? (I was informed by the mother of one of the patients, a muscular, well-developed young fellow, aged 19, that he had never had yaws.) Is it not possible that the severity of such lesions may be proportionate to the severity of the other symptoms of yaws? Yaws, as I have seen it in Nevis, is very different from that disease as it came under my notice in Dominica. Here, in Nevis, the cases are all in children under 12 years of age, and the cutaneous lesions (except the initial ulcers) consist only of "squames" generally, and occasionally of papules. Nowhere have I seen any of the granulomata with crusts which are so commonly observed in Dominica—both in children and adults. This difference may be due to the fact that the children affected with yaws in Nevis have received more regular medical care than those in Dominica, and that they have been treated with small doses of mercury, which have modified the symptoms of the disease; or it may be that the affection in Dominica, owing to climatic conditions (greater dampness, &c.), is of a more virulent type. Allowing, therefore, that the destructive ulceration of the nose and palate is due to yaws, we should expect to find this condition most pronounced in places in which the other symptoms of the disease are most virulent, and *vice versa*.

Another point to be remembered in this connection is the possibility, to which I have already drawn attention in a previous paper, viz., that yaws may manifest itself both as a local as well as a constitutional disease. While the "squames" and papules of yaws may be cutaneous manifestations of the constitutional affection, the encrusted granulomata and the later symptoms may be the result of the local action of the yaws microbes. Similarly the destructive ulceration of the nose and palate may be caused by these microbes acting directly on the tissues in places in which the disease exists in its most virulent form.

Your obedient servant,

J. NUMA RAT

(Medical Officer, Nevis, B.W.I.)

THE second International Congress on "School Hygiene" will be held in London on August 5th to 10th, 1907.

PROFESSOR R. BOYCE, F.R.S., delivered an address on "The Prophylaxis of Yellow Fever, as the Result of the 1905 Epidemic in Central America and New Orleans," at the International Medical Congress in Lisbon

Translation.

PRELIMINARY STATEMENT ON THE RESULTS OF A VOYAGE OF INVESTIGATION TO EAST AFRICA.

By R. KOCH.

(Translated from the German by P. Falcke.)

(Continued from page 105.)

THE conditions thus resemble those of the malaria parasite, which at the commencement of their sexual stage also exhibit a similar differentiation; they, too, having some forms poor in plasma, with plentiful close chromatin, and others rich in plasma but with loose chromatin. I conclude, therefore, that here, too, we have an instance of sexual differentiation, the forms rich in plasma representing the females, and the slender ones, poor in plasma, the males.¹

Whether or not these forms copulate, or whether, as in the malaria parasite, microgametes are first formed, I cannot say, but so far as my observations go the latter process appears the more probable.

In the hindmost part of the stomach, moreover, forms are found which appear to me to represent the further development of the fertilised females. These are very large trypanosomes which possess only one blepharoplast with its flagellum, but several nuclei. The number of nuclei is sometimes two, mostly four (figs. 18 and 19), and in a few cases even eight.

Nuclear fission is, indeed, known to occur even in the simple (asexual) multiplication of trypanosomes, but in such cases the number of blepharoplasts, with their flagella, always equals that of the nuclei.

It stands to reason, therefore, that we have to do with something else than simple fission, as here the blepharoplasts do not multiply, but only the nuclei. Although I have not witnessed the process, I consider it likely that these multi-nucleated trypanosomes split up into a corresponding number of parts, and so form the extremely minute forms which I have so frequently met with in infected flies.²

These latter are simple globular cells, with a single nucleus (fig. 20), and exhibit all transitions to those with nucleus and blepharoplast, to which a flagellum is afterwards superadded (figs. 21 and 22). The shape then becomes elongated, and more and more like the trypanosome. Usually these young forms may be recognised by the blepharoplast being placed anteriorly to the nucleus, towards the flagellar end of the organism (fig. 23). It is only later that it moves near to the nucleus and gradually makes its way to the posterior end of the trypanosome.

Besides these, other forms appear for which I can as yet furnish no satisfactory explanation. One of these consists of longitudinal bundles of long, thin trypanosomes which are often rolled up, and look as if they were produced by the segmentation of a large

cell. There are also tape-like trypanosomes, often of remarkable length, with obtuse extremities. In these forms the blepharoplast is placed anteriorly and the flagellum is very short (fig. 24).

It may be remarked that in the fluid squeezed from the proboscis of the fly there are, besides other forms, nearly always some trypanosomes which resemble the trypanosomes of the blood of infected animals in size and appearance. It may be assumed that infection is transmitted by these. I failed to infect rats by means of the trypanosomes from the stomach of flies.³

As yet, too, I have failed to get any positive results by making *Glossina* feed on animals infected with trypanosomes. When the flies were fed on oxen which had just been attacked with tsetse disease, and harboured many trypanosomes, most of the parasites disappeared as the blood was digested. The trypanosomes refused to develop, and no permanent infection of the flies was found to result. It was only when the flies were made to bite beasts (oxen, mules) which had been long infected, and only incidentally harboured a few trypanosomes in their blood, that a few flies became infected. I am therefore inclined to suspect that all blood trypanosomes are not capable of infecting *Glossina*, but only such as happen to be at some stage with which we are as yet insufficiently acquainted. It seems probable that the infective type of trypanosome is to be found in those large game animals which are little susceptible to tsetse, such as antelopes and buffaloes.

I have frequently found infected flies in regions where they could have been infected by no other agency than that of large game, in the blood of which, as is well known, only very few trypanosomes are present. In the Lungera Valley, where the highest percentage of infected flies was found (17.4 per cent.), there were no oxen, and only very few antelopes. On the other hand, there were goats and sheep which were apparently quite healthy, but most of them had a few trypanosomes in their blood.

In regard to the *Glossina* themselves, it should be noted that the males as well as the females suck blood, and that both sexes become infected and are capable of conveying infection.

G. fusca flies and bites by night. In order to keep this species alive for any length of time they should be given the opportunity of sucking blood every two or three days. The males of *G. fusca* usually sit on shrubs and bushes or on the ground by the way-side. The females are shier than the males, and only appear when they scent animals. Hence flies caught away from animals are mostly males. Amongst the flies caught on animals (mules, asses, oxen) there are always some females, and occasionally they may be as numerous as the males.

The females do not lay eggs like most other diptera, but a single whitish larva, which in a few hours changes into a pupa. *G. fusca* gives birth to only a single larva at a time, at intervals ranging from ten

¹ In my detailed work I shall mention in how far these sexual forms have been seen by other observers.

² Rabinowitsch has already seen the same young forms in the trypanosoma of rats, moreover Novy and McNeal have observed them in their cultures of trypanosomes; possibly also Castellani saw them in the cerebro-spinal fluid of sleeping sickness patients.

³ The Sleeping Sickness Commission likewise had negative results in their experiments to transmit the trypanosoma from *G. palpalis* to monkeys. "Reports of the Sleeping Sickness Commission of the Royal Society," No. vi., p. 286.

to twenty days, according to the temperature of the air, so that the females produce but two or three progeny in a month. The propagation of the *Glossina*, therefore, is very slow compared to that of most insects. This appears to be the weakest point in the cycle of infection of the trypanosomes, and may, perhaps, offer a standpoint for an effective method of combating trypanosome diseases.—(*Deutsche Medizinische Wochenschrift*, November 23rd, 1905.)

JOURNAL OF THE R.A.M.C., APRIL, 1906.

REPORTS OF THE COMMISSION APPOINTED BY THE ADMIRALTY, THE WAR OFFICE, AND THE CIVIL GOVERNMENT OF MALTA, FOR THE INVESTIGATION OF MEDITERRANEAN FEVER, UNDER THE SUPERVISION OF AN ADVISORY COMMITTEE OF THE ROYAL SOCIETY.

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I.—GOATS AS A MEANS OF PROPAGATION OF MEDITERRANEAN FEVER. By Major W. H. Horrocks and Captain J. Crawford Kennedy.

ABSTRACT.

In Part III. of the Reports of the Commission a preliminary note was published on this subject, in which it was shown that goats in Malta suffer from Mediterranean fever, and excrete the *Micrococcus melitensis* in their milk and urine. The further study of this subject may be divided into the following parts:—

- (1) Examination of goats living in pens (a) in the immediate neighbourhood of Valletta and Sliema, and (b) in the more remote parts of the Island.
- (2) Experiments made to determine the possibility of infecting animals by feeding them on milk cultures and infected milk
- (3) Experiments to determine the mode in which the goats themselves become infected.
- (4) Experiments to determine whether it is possible to destroy the *M. melitensis* by Pasteurisation of the infected milk.

General Summary of Results.

- (1) Judged by the serum reaction, 41 per cent of the goats in Malta are infected.
- (2) Ten per cent. of the goats supplying milk to various parts of Malta appear to excrete the *M. melitensis* in the milk.
- (3) The excretion of the specific microbe may continue steadily for three months without any change occurring in the physical character or chemical composition of the milk, and without the animal exhibiting any signs of ill-health.
- (4) Some infected goats may lose flesh and their coats may become thin; they may also suffer from a short hacking cough. A febrile condition, however, has not been observed.
- (5) Goats may have a marked blood reaction (1—100), and yet never excrete the *M. melitensis* in the milk.
- (6) If the blood serum or milk does not agglutinate

the *M. melitensis*, the specific microbe is not found in the milk.

(7) There is no constant relation between the amount of agglutinins in the milk or blood and the excretion of *M. melitensis* in the milk; but the higher the dilution of the serum which agglutinates the *M. melitensis*, the greater is the probability of finding the *M. melitensis* in the milk.

(8) The excretion of the *M. melitensis* in the milk may be intermittent, appearing for a few days and then disappearing for a week or more.

(9) A blood reaction may exist for some weeks before the *M. melitensis* is excreted in the milk.

(10) If blood cannot be obtained, the milk reaction with the *M. melitensis* (Zammit's test) is a good indication of infection.

(11) The milk agglutination test is a surer indication of the *M. melitensis* being excreted in the milk than the serum reaction.

(12) Monkeys and goats can be infected by feeding with cultures of *M. melitensis* isolated from milk, and also by feeding with infected milk itself.

(13) The incubation period in feeding experiments appears to vary between three and four weeks.

(14) Monkeys infected by feeding sometimes suffer from a typical wave of fever and lose flesh, at other times they show no obvious signs of ill-health, and may even gain in weight.

(15) When monkeys become infected by feeding with milk the lymphatic glands always contain far more colonies of the *M. melitensis* than the spleen. This fact suggests that the specific micrococci contained in the food are carried to the lymphatic glands and there undergo considerable multiplication. It has not yet been proved that the mesenteric glands are always infected at an earlier date than the femoral and axillary glands, but Experiment IV., feeding with milk, shows that this may be the case at times.

(16) It has been demonstrated that goats may become infected by feeding on dust polluted with urine from cases of Mediterranean fever. The excretion of *M. melitensis* in the milk resulting from such infection is a late phenomenon, only appearing about seventy-four days after the blood reaction has developed.

(17) It has not been possible yet to convey infection from goat to goat by means of mosquitoes or *Stomoxys calcitrans*. If mosquitoes do carry the infection, it seems more probable that the microbe is transferred from man to goat, than from goat to goat.

(18) Agglutinins may be transferred from the mother to the foetus *in utero*. Pregnancy appears to follow a normal course in infected goats.

(19) Pasteurisation (68° C. for ten minutes) destroys the *M. melitensis* present in infected goats' milk.

II.—THE INCIDENCE OF MALTA FEVER AMONGST THOSE EMPLOYED IN THE MILITARY HOSPITAL, VALLETTA, DURING THE YEAR 1905. By Captain J. Crawford Kennedy, R.A.M.C.

Kennedy finds some evidence of the transmission of Malta fever by mosquitoes; of the liability of persons engaged in nursing, night duty, and cleaning latrines to contract Malta fever; and of the greater

prevalence of the disease in the Valletta Hospital staff compared with other hospitals in Malta.

III.—THE PATHOGENIC MOSQUITOES OF JAMAICA.

By Major F. M. Mangin, R.A.M.C.

In Jamaica, one has unequalled opportunities of making the acquaintance of certain species of this group of the diptera, each of which in itself is the carrier either of malaria, filariasis, or yellow fever, respectively. The species alluded to are: *Culex fatigans*, the carrier of filariasis; *Stegomyia fasciata* and *S. mosquito* (Robineau-Desvoidy), the carriers of yellow fever; and the five species of *Anopheles* found in this island; these are—*Anopheles punctipennis*, *Arribalzagia maculipes*, *Cellia argyrotarsis*, and *Cyclolepidopteron grabhamii*, together with *Cellia albipes*, the commonest form of *Anopheles*. In addition, there are numerous other species of *Culex*, but these are not yet proved to be pathogenic.

Miscellaneous.

SANTYL—A NON-IRRITATIVE INTERNAL ANTI-GONORRHOEIC.

By Dr. H. BOTTSTEIN.
Hamburg.

(Translated from the German by P. Falcke.)

DR. VIETH, of Ludwigshafen-on-the-Rhine, reported on "The Mode of Action of the Balsams" in the *Medizinische Klinik*, No. 5, 1905, and made a statement regarding the preparation and effect of a new balsam, i.e., santyl. According to these statements this drug is preferable to other balsams on account of its non-irritative qualities and its tastelessness. Up to the present R. Kauffmann reports on forty-five cases treated with santyl (*Monatsheften f. prakt. Dermatologie*). He states that santyl is a remedy possessing the advantages of a new santal preparation, while also exhibiting the specific effects of salicylic acid; it is, in addition, free from the unpleasant after-effects of other balsams. Santyl is, moreover, odourless and tasteless, and can be taken as oil in the form of drops. It has yielded good results in the case of female patients with gonorrhœa. Sensitive women who could not swallow the capsules, and objected to other preparations on account of the taste or smell, took santyl in drops without aversion. In santyl, also, the irritative effects on the kidneys are less than in the former preparations. In my total of sixty patients treated with santyl only two complained of slight transient sensitiveness in the region of the kidneys. One patient refused to take the oil, asserting that he had an idiosyncrasy against all kinds of oils. Recently, also, santyl can be obtained in capsules, but it is seldom used in this form except in exceptional cases; travellers, for instance, prefer them in this form on account of their convenience. The progress that santyl represents must not be under-estimated. In those cases, also, in which, for obvious reasons, secrecy has to be maintained, it does not betray the

patient by any evil odour, as is known to be the case in the other sandal preparation.

I would like to call attention to the fact that I have only taken fresh infections under consideration, as, in chronic gonorrhœa, the effects, as a matter of course, are not so striking. For acute gonorrhœa, with its subjective disorders, santyl is an actual specific, and is particularly valuable when the course of the infection is severe and there are marked symptoms of inflammation. Kauffmann observed favourable results in posterior gonorrhœa, and my experience confirms his opinion. Eighteen cases of gonorrhœa of the posterior urethra, which I treated with santyl, ran a light course without complications. The urine also rapidly became clear, and only in one case did I find it necessary to exhibit santyl combined with urotropin, as has been recommended by others.

Statements are frequently made that one drug or the other is able to cure acute gonorrhœa without local treatment. Other authorities, on the contrary, assert that gonorrhœa cannot be cured by means of internal remedies only. P. Meiszner is most positive, and writes as follows in his "Experiences with Arhovin": "It must be understood from the start that a treatment for gonorrhœa which is wholly internal is impossible. Internal preparations for gonorrhœa must therefore only be regarded as adjuvants." Kauffmann is no less energetic in his assertions that it is impossible to cure gonorrhœa without local treatment, and all objective observers will agree with him. If this standpoint is taken, and it is justified by practical experience, the effect of balsams will still be valued, but to a limited extent. The subjective disorders which very frequently trouble patients can mostly be removed by the balsams.

The effect of the various balsam preparations which are used in the treatment of gonorrhœa is about the same, whether balsam, copaiba, or ol. santali is used. Gonosan, which has recently been highly recommended, is said by some authorities to possess anæsthetic properties; nevertheless, other sandal preparations which do not contain kawa (such as santyl) also remove the pains. There is one great difference between the various balsam preparations, namely, the accessory effects. Copaiba balsam frequently causes exanthema, and has therefore been abandoned in favour of sandal oil, in which cutaneous symptoms occur much less frequently. Sandal oil, however, also has several disadvantages, as is well known. Apart from the rough taste which is covered by taking this preparation in capsules, disorders of the stomach or renal pains occur in quite one-third of the cases. The same applies to gonosan. I cannot say that I have observed that it has less unpleasant after-effects than pure East Indian sandal oil; it is also not pleasant to take, as it contains 80 per cent. of pure sandal oil.

In santyl the principal ingredient of sandal oil, santalol, is chemically combined with salicylic acid, producing a neutral and almost tasteless oil. Santyl is chemically analogous to salol, which is the salicylic acid combination of phenol. Such combinations pass through the stomach almost unchanged and are only split up and absorbed in the intestine. The disagreeable effects on the stomach are thereby correspondingly decreased. Santyl can be demonstrated in the urine as early as one hour after it has been taken.

I have used santyl altogether in sixty cases of acute gonorrhœa. It is not necessary to give the histories of the disease, but I may remark that amongst my cases

there were several particularly severe ones in which santyl gave the most satisfactory results. In two cases also with terminal hæmaturia convalescence set in soon, the hæmorrhage ceasing in two and three days respectively, while the pain during micturition, which at first was very great, quite disappeared.—*Medizinische Klinik*, No. 11, 1905.

SANTYL-KNOLL.

A new sandal-wood preparation for the internal treatment of gonorrhœa has been introduced by Knoll and Co., 27A, St. Mary-at-Hill, London. The preparation may be taken in drops or capsules; it is free from disagreeable smell and taste, and does not cause gastrointestinal irritation nor offensive eructations.

Reviews.

BERI-BERI.—“OBSERVATIONS IN THE FEDERATED MALAY STATES ON BERI-BERI.” By C. W. Daniels, M.B.Camb., M.R.C.S., late Director, Institute for Medical Research, Kwala Lumpur, F.M.S. E. G. Berryman and Sons, Blackheath Road, London, S.E. 1906. Pp. 105. Price 3s. 6d.

Published as Part I. of vol. iv. of “Studies from Institute for Medical Research, Federated Malay States,” Dr. Daniels work on beri-beri is deserving of close attention. The recent works on beri-beri by Dr. Hamilton K. Wright, Dr. Travers, Dr. Braddon, Dr. Haviland, Dr. Durham, Dr. T. S. Kerr, and many other observers, are reviewed and considered in all their bearings, and their several theories and conclusions judiciously handled. Every sentence in Dr. Daniels’ observations is written with evident care, having due regard for the work and opinions of others, and a keen appreciation of their efforts to elucidate the cause of beri-beri. It is impossible to quote from a book in which every paragraph bears directly on the context, for the argument is so closely and precisely followed that extracts would be meaningless. We can only state the general conclusions arrived at by Dr. Daniels. These are:—

(1) “That beri-beri is an infectious disease. As a rule, a short period of incubation and a period of exposure of less than three months is requisite for full development of the disease where the ‘endemic index’ is high.

(2) “That there is no definite proof that an intermediate host is required, but the balance of evidence is against its being conveyed by earth, air, water, or food, or contamination with sewage or other faecal matter.

(3) “That there is some evidence that for a short period only after the occupation of small spaces, beds, bedrooms, &c., the ‘poison’ or carrier of infection may remain.

(4) “That food, either as regards quantity and quality, its nature or relative proportions, may have

an effect on the susceptibility of the patients, though the proofs are not conclusive, but is not the causative agent.

(5) “That if an intermediate host for the unknown parasite is required, it must be either a cimex or a pediculus. That pediculi as carriers would better explain the incidence of the disease than any other blood-sucker.

(6) “That a closer enquiry into the earlier stages of the disease is required. That where opportunities for such an enquiry occur, renewed attention should be bestowed on the blood and tissues, with a view to determining the presence or absence of any protozoon.

(7) “Prophylaxis. That in view of the failures of various attempts at disinfection of buildings and places, and of various modifications of diet to have marked effects, more attention should be paid to limiting the chances of personal infection, and that particular attention should be paid to the personal cleanliness, freedom from vermin, and isolation of early or trivial cases of the disease.

“The importance of the disease, affecting as it does the imported labour of the country, causing prolonged sickness and frequently death, cannot be over-estimated in a rich country so sparsely populated as the Federated Malay States. There is evidence that the disease is less common and less fatal than a few years ago; but directly, and as a complication of other diseases, it is still the main cause of the high mortality in the healthiest period of life, amongst the Chinese.

“Every earnest endeavour to improve the conditions of life that has been made in the past has resulted in an improvement. The number of cases is diminishing, and the mortality from the uncomplicated disease less than ever.

“The scope of the enquiries has, as a result of the observations of numerous workers, been diminished, and the prospects of an early solution of the cause of the disease and of its mode of propagation may be confidently anticipated by future workers at no distant date.”

We congratulate Dr. Daniels upon a book which is a model of scientific literary effort, and one which places our knowledge of beri-beri of to-day accurately before us.

New Instruments, &c.

ILLUSTRATED PRICE LIST OF ELECTRO-MEDICAL APPARATUS.—K. Schall, 75, New Cavendish Street, London, has sent us an excellently illustrated catalogue of electro-medical apparatus. The address will, no doubt, be useful to readers.

BECK, R. and T., Ltd., 68, Cornhill, London, have introduced a new form of “Ehrlich” Eyepiece for counting blood corpuscles which fits their “London” Microscope.

Drugs and Remedies.

HETRALINE: A URINARY DISINFECTANT.—Dr. del Amo, in a paper on the antiseptic value of hetraline, states that, in doses of seven grains, repeated four times daily, this drug was useful in cases of bacteriuria. In acute and chronic cystitis, catarrhal urethritis, and the urethritis due to stricture, hetraline is as effective as urotropin, and has the advantage of being less irritating to the tissues.

Medical Notes.

THE EDIBILITY OF THE SPLEEN.

The reason why the spleen, of all abdominal solid organs, is practically the only one not used for human food, is difficult to explain. Dr. Williams, in *American Medicine*, February 10th, brings forward a plea for its consumption, and states that when stewed the spleen is pleasant to taste; it must be cooked and eaten when quite fresh. Considering the physiological importance of the spleen, it is peculiar it has never been used either as a medicinal agent nor as a part of ordinary diet.

CHOLERA.

In the Philippines cholera is spreading, especially in the villages along the coasts and on the rivers. As the villages drain directly into the rivers, a continuance of the epidemic is probable.

SMALL-POX IN CALCUTTA.

Between December, 1905, and March 1st, 1906, it is estimated there have been 5,000 cases of small-pox in Calcutta.

CREeping DISEASE.

Moorhead, J.D., in the *Texas Medical News* of February, describes a skin affection in a boy, aged 5, said to be suffering from Brazilian worm in his foot, which has been given the name "creeping disease." The infection was believed to come from a family from Brazil. The worm travels in the layers of the epidermis at the rate of from $\frac{1}{2}$ to 1 inch in twenty-four hours, leaving a raised line of epidermis about $\frac{1}{2}$ inch wide. The treatment consisted of excision of the part at the point where the worm is advancing, or by freezing this neighbourhood with ethyl chloride spray.

SEVERAL readers of the Journal have asked for information concerning the meaning of the opsonic index. Stated shortly, it may be explained as follows: Wright and Douglas have shown that washed leucocytes possess no phagocytic power when brought in contact with staphylococci, but if normal serum or blood plasma is first added to the staphylococci and then brought in contact with washed leucocytes, the phagocytic action of the leucocytes is re-established. This power seems resident in a substance contained in the serum termed opsonin; to ascertain the opsonic power of a given specimen of blood, the volume of serum is added to equal volumes of a bacterial suspension and of washed leucocytes. After this mixture has been incubated at 37° C. for fifteen or twenty

minutes, microscopic specimens are mounted, fixed and stained, and the bacteria within the leucocytes counted. The number of bacteria within the leucocytes divided by the number of leucocytes counted gives the opsonic index.

Notes and News.

THE growing of cotton in the Federated Malay States is attracting some interest. The cotton, although of qualities somewhat inferior to Egyptian cotton, is stated to be of fair quality, and it is hoped the cultivation may prove remunerative.

MALARIA AND MOSQUITOES.—In Barbados the absence of Anopheles mosquitoes and of malaria is a fact which is well known. The explanation of this phenomenon has been lately attempted to be explained by Mr. C. K. Gibbons to the presence of a small fish, known locally as "millions" (*Girardinus versicolor*), which preys on the larvæ of mosquitoes.

Yet another medical journal was added to the long list of American medical journals on January 1st, 1906, when No. 1 of vol. i. of the *Bulletin of the University of Nebraska* appeared. Henry B. Ward contributes an elaborate paper on "*Filaria loa*."

YELLOW FEVER.—Gorgas states that he has known the *Stegomyia* mosquito live 150 days in captivity.

RESULT OF THE EXAMINATION FOR THE DIPLOMA OF TROPICAL MEDICINE, UNIVERSITY OF LIVERPOOL, HELD ON MARCH 26, 27, AND 28, 1906.

Examiners.

External Examiner, Colonel D. Bruce, C.B., F.R.S.; Internal Examiners, Professor R. Ross, C.B., F.R.S., D.Sc., F.R.U.C.; J. W. W. Stephens, M.D.; C. J. Macalister, M.D., C.M.; R. Newstead, A.L.S., F.E.S., Examiner in Medical Entomology.

The following candidates have been recommended for the Diploma in Tropical Medicine:—

F. A. Arnold, M.B., D.P.H.
J. B. Bate, L.S.A.
J. Dundas, M.B.
N. Faichnie, Major R.A.M.C., M.B.
D. F. Mackenzie, M.B.
A. Pearce, Major R.A.M.C., D.P.H.
R. D. Willcocks, Captain I.M.S., M.B.

RESULT OF THE EXAMINATION, LONDON SCHOOL OF TROPICAL MEDICINE, 20TH SESSION, APRIL, 1906.

The following candidates passed the examination for the Certificate in Tropical Medicine.

Captain S. Anderson, I.M.S., M.B., C.M.Glas., 1896, with distinction.
H. E. Arbuckle, M.B., Ch.B.Edin., 1900, with distinction.
Captain B. H. Dutcher (U.S. Army, M.D.Coll. P. and S. Columbia University, New York), with distinction.
G. J. Pirie, M.B., Ch.B.Aber., D.P.H. 1905 (Colonial Service), with distinction.
A. G. Eldred, M.R.C.S., L.R.C.P. (Colonial Service).

- H. Kramer, M.B., Ch.B.Edin., 1902.
 P. H. MacDonald, M.B., Ch.B.Edin., 1899 (Colonial Service).
 B. Moiser, M.R.C.S., L.R.C.P., M.B.Lond., 1904 (Colonial Service).
 A. Reid, M.R.C.S., L.R.C.P., 1900, D.P.H.Durh., 1902, M.B.Durh., 1903.
 W. Rogers, M.B., B.Ch.Edin., 1900 (Colonial Service).
 W. E. Rutledge, M.R.C.S., L.R.C.P., 1900.
 A. L. Wykham, M.D.Howard Univ., 1887, L.S.A., L.M.

THE "ULTRA MICROSCOPE."

The ultra microscope, designed by Liedentopf and Szrgmondy, and constructed by Zeiss, has had no better success in detecting the organism of yellow fever than the familiar oil immersion. The idea of this instrument is not, strictly speaking, to bring into view, but to notify, the presence of bodies too minute for recognition by ordinary microscopic vision. Such bodies appear as shining points without any definite outline. But even in normal serum the points are so numerous that it is impossible to draw any conclusion as to the presence or absence of specific organisms.

The instrument has been tested in yellow fever by M. Otto and R. O. Neumann, who have recently made an expedition to Brazil to study that disease, but with no better result than their predecessors, except perhaps that they have bearded the lion of disease without loss of life or health, which alone should be a matter of congratulation in the case of a malady to which so many investigators have fallen victims.

PROTECTION BY SERUM AND TOXIN.

A good deal of work is being done in various laboratories with the view of producing an anti-trypanosomiasis serum and to those interested in the subject the following references of recent works may be useful. In the current issue of the *Bull. de l'Institut Pasteur* abstracts are given of the following papers on this subject: Dresing, in the *Archiv. f. Schiff. u. Trop. Hyg.*, October, 1905, p. 427; Schilling, *Zeitschr. f. Hyg.*, 1905, p. 149; and Kleine and Möllers, *Zeits. f. Hyg.*, 1906, p. 229. The results are encouraging, distinct immunity being evidenced in experimental work, but their attempts to protect transport animals do not appear to have been so satisfactory, and the injections themselves do not appear to be entirely without danger.

In the same issue abstracts are given of two papers on the production of immunity against cholera infection by S. Seikouski and by K. Schmitz in the *Persglad lekaroki*, 1905, p. 746, *et seq.*, and the *Zeitschr. f. Hyg.*, December, 1905, p. 1, respectively, but neither appear to have succeeded in conferring immunity of sufficient duration to be of practical use in dealing with cholera.

In countries where cholera is endemic, or, at least, where the danger recurs every year, nothing short of an immunity as long as that conferred by vaccination against small-pox is likely to be extensively adopted, as it is too much to expect people to undergo the by no means considerable inconvenience and even risk of a protective inoculation every few months or so, and,

in a minor degree, the same remark applies to the case of plague.

It must be remembered that for a certain length of time susceptibility is increased by the whole class of protectives which rely on the introduction of toxins, and that even the injection of the serum of immune animals is not without its dangers, so that for practical purposes what is required in either toxin or anti-toxin is that its effects should last long enough to be available for use at times when the plague *pro tem* is not epidemic.

FRENCH AND ENGLISH MORTALITY AND SICKNESS ON THE GOLD COAST.

The *Lancet* of February 3rd contains an instructive abstract of the health statistics of the French tropical colonies based on a report in the *Archives de Medecine et de Pharmacie Militaires* for January, 1906, from which we extract the subjoined table:—

French colonial troops stationed at—	EUROPEANS				NATIVES		
	Average Strength	Sickness per 1,000	Deaths per 1,000	Invalids per 1,000	Average Strength	Sickness per 1,000	Deaths per 1,000
1903							
Western Africa	1,862	1,181	21.4	179.9	5,138	282	12.8
Annam-Tonkin	10,248	886	24.3	118.3	13,777	606	21.9
China Reserve Brigade	2,771	848	11.5	101.4	1,987	478	9.4
China Army of Occupation	1,672	924	10.1	61.0	—	—	—
Cochin China	2,121	1,285	33.0	205.5	1,625	1,063	47.3
Madagascar	4,812	1,091	17.6	187.2	7,202	376	12.9
Réunion	862	878	10.4	92.8	—	—	—
Martinique	914	1,611	10.9	214.4	—	—	—
New Caledonia	728	365	12.3	79.6	—	—	—
Tahiti	103	335	0	19.4	—	—	—
St. Pierre and Miquelon	14	143	0	0	—	—	—
India	4	0	0	0	142	795	7.0
Tchad	72	966	27.7	13.8	730	811	22.3
Guadeloupe	178	2,132	11.5	404.5	—	—	—
Guiana	194	644	5.1	242.2	—	—	—
	26,550	993	19.8	130.7	30,621	523	18.7

It is interesting to compare French results with British in West Africa.

The French troops so employed are, it must be remembered, a long service corps, composed of men who have already gone through the term of military service compulsory on every Frenchman, and so contain none of the callow youths which the exigencies of recruiting compel us sometimes to send to India, and though probably a distinctly younger body of men than our British colonial officials, will be, like them, men in the prime of life, and therefore fairly comparable, especially as the principal causes of death and invaliding are of a sort that attack all ages with tolerable uniformity. It is further to be noted that in addition to the sickness indicated above, all of which was of a serious character, a very large number of men, equivalent to 306.9 per thousand of strength, were treated for slight ailments "à la chambre." Against the comparative youth of the Frenchmen, too, may be placed the fact that like "Tommy Atkins," "Piou piou" is

probably a less careful person than civilians of good social position.

In the same year (1903) the mortality, &c., of Europeans on the British Gold Coast was returned as below :—

How Employed	Number	Deaths	Invalided	Death-rate per 1,000	Invaliding rate per 1,000
Officials	328	5	25	15.3	76.7
Mercantile Firms, &c. . .	335	12	18	35.8	53.7
Mining Companies .. .	1,043	20	92	19.2	88.2
Missions	92	2	2	21.7	21.7
Totals	1,798	39	137	21.7	76.3

By a curious coincidence the total number of the two populations compared differs but little, and the mortality per thousand coincides almost exactly. The French invaliding is, however, more than double of ours.

A further point worthy of note is that however insalubrious a place must be where men are under medical treatment for ailments, great and small, four times in the year, the West Coast is almost a sanatorium compared with Cochin China, with a mortality of 33 and an invaliding roll of 205.5 per thousand, and is distinctly better than Tonquin. Now, the French Possessions in the Malay Peninsula actually march with ours in Upper Burmah, and it is hardly likely that the frontier that divides our possessions demarks any particular difference of insalubrity.

Most medical men who have practised in the East know that storax (*silaras*) is regarded as a most potent drug by the kaid and haqims, but few would be prepared to hear that India imports thirty tons of it annually, or that it is of sufficient commercial importance to render the question of its adulteration desirable by a Government official. However, Mr. D. Hooper, of the Indian Museum, has taken up the matter, and has discovered by chemical analysis that a large quantity of the drug is adulterated with pine resin. A paper on the subject has lately appeared, giving the results of the investigation, and the *Statesman* understands that the attention of the authorities has been drawn to the subject, so that care might be exercised in the future to obtain supplies of storax from authentic sources.

THE BOMBAY CENSUS.

The municipal census calculations have not yet been completed, though promised for Saturday at noon. Roughly speaking the population is put at 960,000, an increase of 190,000 on 1901.—*Pioneer Mail*, February 16th, 1906.

From the same journal we extract the following report of a speech by Lord Lamington on the virtue of cleanliness. If all our Indian Administrators held as sound and practical views on sanitation as the

Governor of Bombay there can be no doubt that the history of hygiene in India would be more satisfactory than it has been.

"Bombay, February 8th.

"His Excellency the Governor, speaking last night at the annual meeting of the Bombay Sanitary Association, said that that Society and the St. John Ambulance Association proceeded on nearly the same lines—one was to meet a sudden emergency and the other was to inculcate the principles of proper sanitation, so that the lives of people in a great city like Bombay might be better preserved. If I remember rightly, he continued, it was at a meeting two years ago that a speaker declared that we had awakened the 'hygienic conscience' of the people, and from what I have been able to see for myself since my advent in your midst this has been strictly borne out. I cannot see myself that the people themselves lack in cleanliness either in their own persons—I am talking generally—or in their houses; but every one ought to extend their horizon and recognise their obligations not only to themselves but also to their neighbours and by practising the virtue of cleanliness they not only benefit themselves but their neighbours and help to preserve public safety. Man does not live alone; he has work in co-operation with his neighbours. Our duty is to persuade them to keep the outside of their houses as clean as they keep their own particular room. There is another matter—that of better ventilation. To my mind, it is brought home to us day by day by the medical authorities in every country, in every part of the world, that you cannot have too much fresh air. It is most deplorable even when I go round my own lines in Government House to see how, after a certain hour every little window is barred and barricaded as though they expect an attack from a foreign enemy. There is no possibility of fresh air, and whatever germs there are in this vitiated room go on multiplying. There are two great principles in which the majority of people want educating. One is to keep the outside of their houses or chowls clean, and the second is not to be afraid of fresh air."

We also extract an article on Professor Klein's new prophylactic for plague, which is of interest as indicating the trend of expert opinion in India on the merits of the new agent as compared with that of Haffkine's, which has been so long in use in that country.

"Professor Klein's report to the Local Government Board on his new plague prophylactic was forwarded to one of the leading experts upon the subject, who writes as follows :—

"The experiments at present recorded are neither sufficient nor complete enough for an opinion to be formed as to the ultimate utility of this vaccine. It seems, however, that the results of the experiments do not sufficiently warrant the claims to superiority in comparison with the vaccine prepared by Haffkine. There is no doubt that Haffkine's method of prophylaxis has had a considerable amount of success. The Indian Plague Commission reported favourably on this method, and it is generally admitted that inoculation of this vaccine diminishes the incidence of attacks of plague, and that the mortality among inoculated persons is considerably less than among those not treated. The question as to the duration of the protection afforded is difficult to decide. It is probably not less than three months. There are certain disadvantages in this method which have prejudiced many against its use. Protection is not conferred on those inoculated for some days after the treatment, and during this period there is an increased susceptibility to an attack of plague. Consequently there is doubt as to whether its use in the presence of an epidemic is advisable. The protection afforded is not always complete, and is of short duration. Thus, while this vaccine is a valuable means of protecting temporarily against plague,

it is not a method of much practical use in face of an epidemic of plague. It not infrequently occurs that after inoculation the individual suffers from severe symptoms somewhat resembling those of the disease itself.

"The new prophylactic of Klein does not appear to solve any of the present difficulties. His material is highly toxic. Like most other vaccines, it contains the dead bacillary bodies and their toxins. It also contains many other unknown constituents, the result of the inflammatory reaction of the tissues. The immunity conferred by its application is doubtless principally due, as in the other vaccines, to the toxins and the dead bacilli. It has not yet been ascertained at what time after the inoculation the immunity is established, and for what period it persists. Klein found the immunity present one to thirteen weeks after inoculation, a time limit which is inferior to that established by Haffkine's vaccine. The possibility of standardising the prophylactic by injection into rats is of value, but it is equally possible to standardise Haffkine's vaccine by injection into the guinea-pig. The new method described by Professor Klein is doubtless a means of affording protection against an attack of plague, but until many more experiments are completed to establish the nature and extent of this immunity it is premature to claim superiority over the other existing methods of vaccination. It is not simply a question of obtaining a cheap, easily prepared material. To combat plague, especially under the conditions which exist in India, there has yet to be discovered either a serum with curative properties or a vaccine which will confer a rapidly established and durable immunity, and be attended with no danger to those treated."

It may be remembered that in our issue of February 15th we reproduced a letter to the *Pioneer* from a correspondent in the Punjab on the occasional poisonous effects of the stalks of the millet known as jowar, when used as fodder for cattle, the writer stating that the people believed the poisonous action to be due to the presence of "small worms." The *Pioneer Mail* of February 16th contains a second letter from a Burmese official, which shows that the same view is held by the natives of far-away Burmah. It is well known that many insects are poisonous, so that it is by no means impossible that the native agriculturists may be correct in their belief, and the question is certainly worthy of investigation by the economic entomologist, if India chances to possess such a functionary.

CATTLE FEEDING ON JOWAR STALKS.

"SIR,—With reference to your article on cattle being poisoned by eating jowar stalks in your issue of January 18th last, and a letter from 'W.' in your issue of January 18th on the same subject, the following may be of interest:—

"The Settlement Officer, Magwe District, Upper Burmah, in his Settlement Report, seasons 1897-1903, remarks: 'In years of drought, when the plant (*i.e.*, jowar) becomes stunted and dried up, the stalks are poisonous to animals, and cattle sometimes die from eating them. In this district (Pakkoka) jowar is one of the main crops, and, of course, jowar stalks are used as fodder. The Burmans here tell me that in years of drought, before the ear has unfolded itself, an insect gets into the stalk; while so inhabited the stalks are poisonous, and, if eaten by cattle or ponies, cause death within a few hours. The insect appears to leave the stalk when the "ear" opens, which it would naturally do, of course, on the cessation of the drought.'"

A NEW JOURNAL FOR TROPICAL VETERINARY MEDICINE.

As for many years past it has been felt that there existed a distinct want for a scientific publication deal-

ing with veterinary pathology in the Tropics, certain officers of the Indian Civil Veterinary Department have undertaken the publication of a quarterly periodical entitled the *Journal of Tropical Veterinary Science*, the first issue of which, dated January, recently made its appearance. Each number will, as far as possible, consist of original articles of scientific interest, with the exception of such pages given up to reviews and extracts from current literature as may appear to demand attention. Each of the three Editors—Major H. T. Pease, the Principal of the Punjab Veterinary College, Captain Baldrey, the Professor of Sanitary Science at the same Institution, and Mr. R. E. Montgomery, I.C.V.D., who is now on special duty investigating camel diseases—contribute articles to the first number, while Professor A. Lingard, Imperial Bacteriologist to the Government of India, has two articles. The journal is published by Messrs. Thacker, Spink and Co., and is excellently got up, clearly printed and illustrated with plates and diagrams. The annual subscription, including postage, is Rs. 12.8.—*Pioneer Mail*, February 28th.

THE MEDICAL (LUCKNOW) COLLEGE FUND.

At a largely attended meeting held here and presided over by Mr. H. M. R. Hopkins, I.C.S., Collector, Rs. 17,000 were subscribed on the spot towards the Memorial Medical College, Lucknow. The principal speakers were Mr. Hopkins, and Syed Alay Nabi, B.A., and Munshi Narayan Pershad, M.A., Vakils. More subscriptions are expected.

PLAGUE WORK AT THE PAREL LABORATORY, BOMBAY.

During the past eight months, the Health Department have been engaged in trapping, poisoning and collecting rats, with the result that over 30,000 rats have been collected and sent to the Parel Laboratory for bacteriological examination every month, the Plague Research Commission supervising the work there. The report on the result of the examination of each rat is sent daily to the Executive Health Officer. When a rat is found to be infected the house or gully where it was found is marked "P.R." with the date, so that the premises and neighbourhood may be under observation. The Plague Commission are now working at Parel, and visit as many of the infected places as possible to collect material for their work. Cards are provided which are filled in by the district registrars giving information in detail about the rats and infected places, and the condition of the locality and its plague history. On an average, 1,100 rats have been examined daily at Parel, and the result sent at once to the Health Department. The proportion of infected rats recently increased from 2 to 20 per cent.—*Pioneer Mail*, March 28th, 1906.

Dr. Claus Schilling has been appointed head of the newly founded department of tropical diseases and hygiene established in Berlin in connection with the Institute of Infectious Diseases.

Seismic disturbances and prolonged drought have prevailed in several of the West Indian Islands;

St. Lucia and St. Vincent have suffered from severe earthquakes, and drought has been especially prevalent in Barbados, British Guiana, Grenada, and Trinidad.

THE PREVENTION OF YELLOW FEVER.

The Colonial Office authorities have issued a concise, practical, and clearly written eight-page pamphlet on "The Prevention of Yellow Fever." The general directions are based upon the assumption that "yellow fever can be absolutely suppressed by the application of simple, practicable, and non-costly methods," devoted to the prevention of infection of human beings by the bites of the *Stegomyia* mosquito. The pamphlet is illustrated by drawings of the *Stegomyia fasciata* and of the larvæ of *Stegomyia*.

His Excellency the Governor-General of the Sudan has directed that a Commission be appointed to investigate the possibility of the extension of "sleeping sickness" into Sudan territory. The Commission to be as follows: Lieut.-Colonel G. D. Hunter, D.S.O., P.M.O.E.A.; Dr. Andrew Balfour, Director Wellcome Research Laboratories, Khartoum; a British medical officer, Egyptian Army, or medical inspector, Sudan Medical Department, or such members as may be hereafter appointed.

Points to be Investigated.

- (1) To ascertain the distribution of various species of tsetse-flies or other biting flies in the Sudan.
- (2) To ascertain if the disease at present exists in Sudan territory. If so, to determine the exact areas, and to what extent the distribution of the disease coincides with the presence of the tsetse or other flies in these areas.
- (3) A systematic investigation of the blood of a population in an infected district.
- (4) A thorough and complete research into the character of the disease, especially as regards its origin and spread.

DEATH OF A POPULAR DOCTOR.

The death took place, on the night of the 21st inst., of Rai Bahadur Doctor Ram Lal Chuckerburty, who, for more than a quarter of a century, was one of the leading medical practitioners in Oudh. He was much beloved, admired, and trusted by all communities. He succumbed to an attack of plague, after suffering for six days. His age was 65. He leaves behind him a widow, three sons, and three daughters. His remains were carried in a special train to Cawnpore for cremation on the banks of the Ganges.—*Pioneer Mail*.

The University of Allahabad has been directed by the Government of the United Provinces Agra and Oudh to consider the question of forming a faculty of medicine.

The Government of Bombay has appointed a mixed committee, under the presidency of the Surgeon-General with Government of Bombay (Civil Department), to investigate the prevalence of malarial and other fevers in the city. According to municipal statistics the deaths from these causes have varied from 7,513 in 1880 to 2,333 in 1903.

Personal Notes.

R.A.M.C.

The following officers of the R.A.M.C. are to command the Station Hospitals named: Lieutenant-Colonel S. G. Allen, Kala-
bugh; Lieutenant-Colonel R. G. Hanley, Kaldanna; Major O. R. A. Julian, C.M.G., Cherat; Major R. Holyoake, Solon; Major G. Scott, Gharial; Major T. W. Gibbard, Barian Camp; Captain F. S. Walker, Khyra Gali and medical charge of the School of Musketry, Changla Gali; Captain H. W. Long, Upper Topa; Lieutenant J. A. Turnbull, Khanspur; Lieutenant A. W. Gater, Ghora Dhaka; Lieutenant S. M. W. Meadows, Clifden; Lieutenant R. H. L. Cordner, Hara Gali; Lieutenant H. T. M. Wilson, Lower Topa.

INDIAN MEDICAL SERVICE.

India Office: Arrivals, &c., of Medical Officers; Reported in London during April.—Lieutenant-Colonel J. B. Gibbons, Captain J. B. Christian, Captain S. Evans, Captain L. Reynolds, Captain A. W. C. Young, Lieutenant-Colonel R. H. Charles, Lieutenant-Colonel P. D. Pank, Major L. F. Childe, Major F. G. Maidment, Captain H. M. Cruddas, Captain H. W. Illius, Captain F. N. White, Lieutenant G. F. Harkness.

Nursing Sisters.—Miss B. Crane, Miss D. L. T. Moore.

Extensions of Leave.—Major H. E. Drake Brockman, 6 m.; Captain W. Lapsley, 3 m.; Professor Haffkine, 6 m.; Major J. G. Jordan, study leave, 3 m. 25 d.; Major H. Austin-Smith, study leave, 1 m.; Major G. F. W. Ewens, study leave, 8 m.; Captain R. E. J. Lester, 5 m.; Major E. V. Hugo, to July 2nd; Major J. Stodart, 5 d.; Captain H. H. Brown, 6 m.

Permitted to Return to Duty.—Captain V. B. Bennett, Lieutenant E. C. Hodgson, Major E. Hugo, Lieutenant-Colonel J. A. Cunningham, Major J. Stodart, Surgeon-General W. L. Gubbins, A.M.S.

Postings.

Captain Battye, I.M.S., acts as Consul-General, Meshed, during the absence of Major Sykes, I.S.C.

Major Duke, Civil Surgeon, Bikanir.

Major Robinson, Residency Surgeon, Jaipur.

Major G. B. Hunter, services lent, Punjab Jail Department.

Lieutenant-Colonel R. E. S. Davis officiates as Inspector-General, Prisons, Burmah.

Major J. P. Penny officiates as Civil Surgeon, Rangoon.

Captain E. R. Rost to charge of Plague Hospital, Rangoon.

Captain W. V. Coppinger officiates as Civil Surgeon, Myensingh.

Lieutenant A. D. White holds additional Civil Medical Charge of Buxa Duar.

Lieutenant-Colonel W. A. Quaile, Civil Surgeon, Jubbulpur.

Major A. G. Hendley, Civil Surgeon and Superintendent Jail, Sangor.

Major B. R. Chatterton officiates as Surgeon Superintendent, Presidency, General Hospital, Calcutta.

Major J. G. Gordon, Civil Surgeon, Chittagong.

Captain C. G. Seymour officiates as Civil Surgeon, Cachar.

Major D. R. Green, Civil Surgeon, Khasi and Jantia Hills.

Major C. Milne, Civil Surgeon, Fyzabad.

Lieutenant-Colonel T. R. Mulroney, Civil Surgeon, Karnal.

Captain T. G. Stokes, for the season to Pachmari.

Captain C. G. Seymour to Civil employ, Eastern Bengal and Assam (temporary).

Major Bird officiates as Professor of Surgery, Calcutta.

Captain J. R. Tyrell has been placed on plague duty in Ajmir-Merwara.

Captain E. D. Greig has been placed on special duty in Central Research Laboratory, Kasauli.

The following I.M.S. officers have been granted leave:—

Major R. G. Turner (furlough, privilege, and study leave), 17 m. 17 d., from April 10th.

Major J. Chaylors White (privilege and urgent private), 6 m., from March 30th.

Major G. M. Smith (privilege and furlough), 16 m.

Lieutenant-Colonel J. R. Adie (study), 6 m.

Lieutenant-Colonel Charles, Professor Surgery, Calcutta, furlough, 12 m.

Major Green, Civil Surgeon, Muzaffarpur (furlough), 2 y.

Captain A. Moorhead (combined leave), 8 m.

Captain H. Illius (general leave in India), 1 y.

Captain Wilson (combined and study), 18 m.

Captain H. Hamilton, C.B. (privilege leave), 90 d.
 Captain A. Leventon (combined leave), 20 m. 18 d.
 Major C. R. M. Green (combined leave), 2 y.
 Major G. W. F. Braide (combined leave), 7 m.
 Captain R. P. Wilson (combined and study leave), 18 m.
I.M.S. Retirements.—Lieutenant-Colonel Banerjee, Lieutenant-Colonel J. A. Dalal, Lieutenant-Colonel H. Mariett.

Prescriptions.

FOR FACIAL NEURALGIA.

R. Butyl-chloral ... gr. 3 to 5.
 Tinct. gelsemium ... m 5 to 10.
 Glycerini ... m xxx.
 Aq. anethi ... ad 3ss.

For one dose. Repeat at required intervals. (Suggested by W. H. Wynn.)

TO PREVENT INTESTINAL FERMENTATION.

R. Careful dieting, and calomel thrice daily in doses of $\frac{1}{40}$ to $\frac{1}{20}$ grain. (W. H. Wynn.)

ACUTE DYSENTERY.

R. J. Windle recommends:—

No. 1.

R. Chloral hydrat. ... grs. xx.-xxx.
 Liq. opii. sed. ... mxx.
 Aq. ad. ... 3i.
 Syrup. aurant. ... 3ii.

No. 2.

R. Pulv. ipecac. ... grs. xx.-xxx.
 Aq. chloroformi ... 3i.
 Mucilag. tragacanth. ... q. s.

No. 2 is given ten to fifteen minutes after No. 1.

URTICARIA.

To allay itching apply:—

R. Acid. thymic ... grs. xv.
 Acid. carbolic ... grs. xxx.
 Menthol ... grs. iv.
 Eau de Cologne } ... aa 3 ijss.
 Sp. camphor }

—*Progrès Médical.*

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Münchener Med. Wochenschrift," January 2, 1906.

Although antivenin is always used in Austria in cases of snake-bites by vipers, in Austria a ready means of treatment is described as follows: Application of a tourniquet, an elastic constriction is applied on the proximal side of the bite, and 20 cc. to 30 cc. of a 1 in 22 solution of chlorinated lime in water is injected into and round the seat of the bite. This treatment seems to be efficacious.

"Journal American Med. Association," March 10, 1906.

THE DIBOTHRIOCEPHALUS LATUS (THE BROAD TAPEWORM) IN MINNESOTA, U.S.A.

Nickerson, S. D., reports a case of infection by the broad tapeworm, occurring in a patient resident in Minnesota. Hitherto such cases were believed to be importations from Northern Europe, and the case described by Nickerson was

in a child of 3 years of age, born in Minnesota of Finnish parents, of whom the father was known to have suffered from the worm.

Infection by the broad tapeworm occurs through the injection of the larvæ (plerocercoid) embedded in the flesh of certain fresh-water fishes. As fresh-water fish are not imported into America from Finland, the conclusion seems to be that some native American fish must harbour the larvæ. Moreover, it has been proved that infection of American fish by the larvæ of *Dibothriocephalus* is possible, and it only requires the arrival of an infected adult population from districts (Finland, Scandinavia, Poland or North Germany) where the disease is prevalent, to understand how the eggs and larvæ can travel by the sewers into inland fresh-water lakes or streams, and so infect the fish. As however, it is only when fresh-water fish are eaten raw, or partially cooked, that the disease can be conveyed, it is difficult to understand how human beings become infected, although domestic animals, such as cats and dogs, would be liable to harbour the parasite.

"Le Caducée," March 3, 1906.

"Cutaneous Eruptions of Malarial Origin, and What they Foretell" (Les éruptions cutanées du paludisme; conséquences à en tirer au point de vue des manifestations de cette affection). By Surgeon-Major Claude.

As in the case of the majority of intoxications and of general diseases, malaria has also its cutaneous manifestations. Dr. Billet was one of the first to describe them, and as his observations on malarial febrile erythema were all supported by an analysis of the blood of the patients their origin is undeniable. Dr. Coste, who is in charge of the military hospital at Arzew, has also quite recently made a study of the cases of dermatitis of malarial origin which absolutely resemble, by their eruptive characteristics, the rash of measles. Malarial urticaria has been noted by Lepinaasse in the Sudan; Vacari has also observed several forms of it.

Surgeon-General Moty attributes to malarial infection certain cases of cutaneous gangrene, closely allied to urticaria, which he accounts for as follows: Obstruction of the capillaries by pigmented leucocytes, want of nutrition induced thereby, and necrosis of the tissues.

An analysis of the blood should always, therefore, be made to confirm the truth of their malarial origin, but this for many reasons is not always practicable in malarial climates; microscopes are not always ready to hand, and their carriage offers many difficulties. In any case, cutaneous manifestations, generally of a febrile character, should always, when they occur in a tropical or marshy district, be considered as possibly malarial in origin. But we, for our own part, are of an opinion that they have also an importance as forerunners of further phenomena; they may, indeed, be premonitory of a severe, and even very dangerous, attack of acute malaria; in chronic malaria, on the other hand, the eruptions seem to foretell, at an early date, a return of a true febrile attack, similar in all respects to the acute form of ague.

The following notes leave no doubt in this respect; they have been condensed, and only the main facts are here recorded:—

(1) Mrs. X., a recent arrival at S., a very malarial spot in the province of Oran, was laid up in August, 1904, with an acute attack of ague. One of these attacks was accompanied by an erythematous eruption over the body generally, extending in patches even to the face; the fever subsequently took on a continued type. Suddenly, attacks of hæmoglobinuria developed, the eruption disappeared, and death took place on the fifth day.

(2) Zouave, N., stationed at S. for several months, has never had ague; in September, 1903, he was admitted to hospital with acute malaria. Whilst in hospital he developed shingles on the left side of his chest. The next day he was seized with a pernicious attack. The patient died in a few hours, in spite of injections of quinine, &c.

(3) S. (of Spanish extraction) was admitted to hospital at

Daya in August, 1903, with acute ague. During an attack an erythematous rash appeared on his trunk and face. As delirium set in, he was taken back to his house by his friends. The eruption ceased the same day that he returned. The patient died the next day in convulsions in spite of all care.

The rapidity with which all these three cases of cutaneous manifestations were followed by a fatal termination is truly worthy of note. Fortunately, in chronic malarial patients the eruptive manifestations do not appear to be of such serious import; this statement is borne out by the following cases:—

(1) X., an army surgeon, since his return to France from Algeria, has suffered from several malarial attacks, which were more frequent than when he was abroad; at times he suffers from a severe pain in the regions of the left brachial and cervical plexuses. One evening he was suddenly seized with an attack of urticarial eruption, limited to both hands and both forearms; there was an unbearable itching for two days, then the urticarial rash disappeared, but the patches of skin seemed as if wine-stained. All these symptoms disappeared, but X. was seized with a true fit of ague, with all its three stages. Three months later the same symptoms were repeated in an identical manner. Quinine had but little effect either on the rash or the attacks of ague which followed them.

(2) Captain N., of the 3rd Zouaves, stationed in France for the last year, was seized one evening in March, 1905, with general prurigo, also with urticarial patches on the upper limbs and on the neck. He consulted the surgeon on duty and informed him that, in consequence of this manifestation, he would suffer in a few hours from a long and sharp attack of ague. True enough, ten hours later the premonitory rigor commenced. The attack was followed by prostration which lasted four days. This officer stated that this was always the case after the urticarial attacks, whilst when there was no eruption he was always able to return to his work immediately after the ague fit was over.

(3 and 4) Two similar cases to the above in non-commissioned officers were also recorded; these were both old malarial subjects.

It would, therefore appear that the following conclusions may be applicable in all cases of malarial intoxication of whatever date:—

(1) All cutaneous manifestations occurring in a malarial subject would appear to foretell a more or less serious relapse.

(2) With a view to meeting the gravity of this relapse, all therapeutical means should be employed immediately on the onset of the eruption, although in all our own cases they appeared to us to be of little effect; but further trials might be made in this respect.

"Verhandlungen der Deutsch. Zoolog. Gesellschaft,"
1905, p. 16.

ON THE FECUNDATION OF THE PROTOZOA.

Schaudinn emphasises the modern view of the nuclear dimorphism of these organisms, concluding that "in all protozoa, whose cycle of evolution and fecundation is known, a dualism of the somatic and reproductive nuclear constituents may be recognised at some stage of development." Applying these ideas to the complicated structure of trypanosomes, and especially to that of *Trypanosoma noctuæ*, he identifies the flagellar apparatus of a trypanosome as equivalent to the macro-nucleus or vegetative nucleus of an infusorian, but does not include the smaller nucleus or blepheroplast with the flagellum in this homology.

The two chromatin masses of the trypanosome, i.e., the nucleus proper and the blepheroplast, are for him the equivalent of the infusorian micro-nucleus, both being, he points out, mainly formed of reproductive elements. In the process of evolution, the large nucleus throws off its vegetative elements in the form of chromatin, while the small nucleus develops the locomotive apparatus, so that the two com-

bined represent the primitive element of the infusorian; and Schaudinn concludes that the trypanosomes exhibit a double nuclear dimorphism.

It may be remembered that Schaudinn divides the oökinets of *Halteridium noctuæ*, which develop in the mosquito into trypanosomes, into male, female, and indifferent forms. The female forms are large with a big nucleus, and the locomotive apparatus and blepheroplast but little developed. The male forms, on the other hand, are small with small nucleus, and large locomotive parts and blepheroplast. He thinks, therefore, that the large nucleus contains mainly male, and the blepheroplast female elements.

This sexual distinction originates in the earliest development of the oökinets. In all there is a division of the nucleus of copulation into a large and small nucleus, the former aborting in the males, and the latter in the females, while in the intermediate forms both persist. He emphasises the peculiarities of copulation in *T. noctuæ*—quantitative and qualitative nuclear reduction (expulsion of male and female substances, and reduction of the number of chromosomes to one-half; persistence of male and female centrosomes; and independent unions, two and two of the male nuclear elements of the male with the female nuclear elements of the female.—(Trans. of F. Mesnil's abstract in the *Bulletin de l'Institut Pasteur*.)

"Transactions of the Liverpool Biological Society,"
1905, p. 275.

FISH PARASITES.

Johnstone, J., describes a considerable number of trematodes, cestodes, an *echinorhynchus* and a sporozoan from a number of common edible fishes, and his paper has necessarily a comparative interest for all engaged in the study of helminthology.

"Atti. R. Accad. Lincei de Roma," 1905, p. 411.

CUTANEOUS INFECTION BY ANCHYLOSTOMUM.

Pieri, Leno, concludes that man is infected either by swallowing the mature larvae of (or by penetrating the skin) the *Uncinaria americana* as well as *U. duodenalis*, being both capable of infecting man by either route. The same remark applies also to *Dochmius trigenocephalus* and *D. stenocephalus* of the dog, but in this animal infection by penetration of the skin is the more efficient route of infection.

"C. B. Acad. des Sciences," cxii., p. 1204.

IDENTITY OF SURRA AND MBORI.

Laveran, Prof. Experiments conducted by Vallée and Panisset show that bovines immune to the surra of Mauritius are also so against mbori, the trypanosomiasis of dromedaries in Timbuctoo. M. Laveran now shows that, conversely, a goat immune to mbori is also so to Mauritius surra, thus placing the identity of these diseases beyond question.

"Centralblatt f. Bakter.," I., Origin, 1905, p. 43.

SPREAD OF PLAGUE THROUGH THE AGENCY OF INSECTS.

Hunter, W., of Hong Kong, points out that insects have long been suspected as possible vehicles of plague infection. For example, in 1498, Archbishop Knud wrote that the approach of plague is heralded by a change of weather with thick fogs and the appearance of swarms of flies. He discusses at length the potentialities of flies, mosquitoes, lice, fleas, and cockroaches in this respect, and the organs of these insects in which the virus may be carried; and the mechanism of infection by the fouling of clothing, food, &c., or by biting. His conclusion is that insects are actually capable of transporting plague to long distances, but that there is little to choose between biting and non-biting insects in this connection, as he believes that the danger of bites from insects that have been on plague patients is greatly exaggerated, and that the really important point is that many insects are capable of infecting food, clothing, and furniture of all sorts.

EXPERIMENTS ON THE TREATMENT OF TRYPANOSOMIASIS BY MEANS OF ANILINE COLOURS.

These experiments form the subject of an inaugural dissertation by Ewald Franke, and were conducted under the superintendence of Prof. Erlich, who himself, in conjunction with Shiga, had already made some experiments with a dye called trypanroth. An injection of this dye appears to cure mice infected with "caderas," and Franke now finds that immunity lasts for twenty-one days after the cure. Neither malachite green nor ethyl green proved as effective as trypanroth. Even better, is a combination of arsenic and trypanroth suggested by Laveran.

Franke also cured a monkey (*Cercopithecus callitrichus*) by a combination of arsenic and another dye which he merely speaks of as being "near" trypanroth. The serum of this monkey was also proved to possess parasiticide and agglutinating powers.

"Indian Medical Gazette," April, 1906.

TEN DAYS' PIGMENTARY FEVER OF BENGAL.

Cobb, Lieut.-Colonel R., says: This form of the indeterminate fever of India occurs during the hotter part of the year, and is characterised by "continued fever," lasting from eight to ten days, and the presence of a peculiar pigmentation of the face which follows the febrile attack. It usually seems to occur in persons who have been exposed to great heat, and the onset appears to closely resemble an attack of influenza, apart from the more usual catarrhal symptoms of the latter. The pigmentation is "bat-shaped," taking the same form as the eruption of lupus erythematosus. No parasites are found in the blood, nor is the liver or spleen affected. A detailed account of a typical case and short notes of twenty-nine others are given by way of illustration.

This is an interesting instance of the differentiation of a class of cases that undoubtedly, till lately, would have been put down to the credit, or rather discredit, of malaria.

"Bull. de l'Institut Pasteur," T. 4, p. 241.

Summary of papers presented to the Annual Meeting of the Society of American Bacteriologists at the University of Michigan.

Norris, Pappenheimer and Flourney, preliminary communication on the infection of white rats with spirochætes, and on the multiplication of the latter in a liquid medium.

With the blood of a case of relapsing fever they succeeded in infecting both monkeys and white rats. The latter when infected by subcutaneous inoculation showed more or less numerous spirochætes in their peripheral blood for the next two or three days, and these persisted from one to three days. Beyond splenic engorgement, the rats did not seem ill, and there were no relapses. They succeeded in as many as twenty-five serial infections, and the infected rats acquired immunity, but though their serum, mixed with infective blood, retarded the evolution of the spirochætes, it was useless when injected a few days before. The authors observed nothing indicative of longitudinal division, and believe that proliferation takes place transversely, and that the spirochætes are really nearer to the bacteria than to the protozoa; nor could they find any sign of either cilia or undulating membrane. The spirochætes in a small quantity of infective blood added to citrated human or rat blood multiplied considerably, and this could be repeated once, but no more. Citrated infective blood retained its infectivity for six hours at the temperature of the laboratory.

TRYPANOSOMES OF MOSQUITOES.

Novy, F. G., MacNeal, W. J., and Torrey, H. N., of the University of Michigan. As the result of their work on the cultivation of the trypanosomes of birds, the authors maintain that the flagellates observed by Schaudinn in mosquitoes are not, as the latter thinks, evolutionary stages of the endoglobular parasites of the birds, but cultivations *in vitro* of trypanosomes present in the blood of the birds

experimented with. They, therefore, try to show that trypanosomata can live and multiply in the intestine of mosquitoes under forms corresponding with those which can be got *in vitro*.

Mosquitoes (800) were caught and fed on animals ascertained to be free from hæmatozoa. The intestines of 15 per cent. of the mosquitoes contained flagellates, the lumen of the intestine in some being quite obstructed with masses of rosettes of flagellates with the flagellæ in the centre. Several different trypanosomes were found, *Crithidia fasciculata* and a form perhaps identical with *Herpetomonas subulata* being the commonest. Owing to the presence of bacteria, cultivation of these flagellates was difficult, but the *Herpetomonas* was isolated in company with a small coccus and the *Crithidia* together with a yeast; and these cultivations remained for six months in the laboratory, while in the others the flagellates were crowded out by the bacteria. These cultural forms are identical with those of the mosquitoes, *e.g.*, the blepheroplast is always in front of the nucleus and, under both conditions, the *Herpetomonas* has two characteristic diplosomes in the hinder part of the body.

The results of inoculations of animals with the cultures were negative. When mosquitoes are fed with *Trypanosoma brucei* or *T. lewisi*, these parasites persist for more than twenty-four hours in the intestine of the mosquito, and retain their infectiveness for rats. The authors believe, therefore, that the trypanosomes found in the stomachs of tsetse-flies, fleas, &c., are really cultural forms, the blepheroplast being in front of the nucleus. They conclude, therefore: (1) That these forms can be cultivated in test tubes; (2) that the herpetonads found in flies and mosquitoes are really cultural trypanosomes, and that further researches will demonstrate the hæmatozoa, from which they originate; (3) The *Crithidia*, on the other hand, have no undulatory membrane, and for the present may be taken to represent a distinct genus.

Novy, E. G., and Knapp, R. S., describe a method of isolating trypanosomes from accompanying bacteria.

"Ann. Inst. Pasteur," December 12, 1905.

Emile-Weill, P., details various attempts to cultivate the *Bacillus lepræ* in a variety of media, and comes to the conclusion that success depends on the presence of human tissue elements included in the leproma, as in only two instances of cultivations on yolk of egg did the bacilli survive after having digested those cells.

"C. R. Soc. Biologie," T. lx., p. 291.

Sergerit, Edm. and Et., describe, under the name *Herpetomonas algeriense*, a flagellate often found in the intestine of *Culex pipiens* and *Stegomyia fasciata*, bred in the laboratory at Algiers. In its motile form it has an elongated, pyriform body, with a flagellum, which arises from a centrosome placed behind the nucleus. Besides these there are spherical motionless forms with long flagella.

Besides these they have found in an old preparation made in 1901 from the intestine of *Anopheles maculipennis* another flagellate, with a very long fusiform body, pointed behind and rounded in front, with a long lash, which resembles *Herpetomonas jaculum*, discovered by Leger. The same preparation also contained a number of spirochætes.

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

THE PURU OF THE MALAY PENINSULA.

By T. D. GIMLETTE, M.D.

*Awarded a Craggs' Research Prize, 1905,**London School of Tropical Medicine.*

A DISEASE known by the Malay name of puru has never been described in detail from the Malay Native States before, and although it is very common among Malays, nearly all our information concerning it has hitherto come from the group of islands which forms the Malay Archipelago.

This wholly unmerited neglect by residents on the mainland in the description of puru has probably been partly due to the tardy exploration of this part of Further India, which was only commenced lately [1], partly to the natural reticence of the natives and the suspicion with which the Malay peasantry regarded the prying eye of Western medical science, but chiefly to want of independent medical observers with time and opportunity for special investigation.

Until quite recently the prevalence of puru in British Malaya seems to have even escaped the attention of the Federated Malay States Government, but this, again, is probably owing to the fact that the disease does not interfere much with labour, which is mainly carried on by Chinese, and, speaking generally, because it does not permanently injure the health of the Malay to any extent. The natural tendency of the disease is towards spontaneous cure. Death from puru is unusual; it is seldom fatal, unless during very early childhood or in advanced old age.

A period of seven years' service in the Government of the Federated Malay States, spent in the States of Pahang, Selangor, and Perak, has given me experience of puru, and a further residence of over two years in Kelantan, a Malay State hitherto unexplored by students of tropical medicine, and one in which this disease is most prevalent, has afforded me an unusual opportunity for observing it under purely native conditions. My contention is that the puru of the Malay peninsula is identical with the West Indian and African yaws and the Fijian koko, and that it has no real relationship with syphilis.

THE HISTORY OF PURU.

The earliest references which can be taken as bearing upon puru are by Bontius in 1718, who seems to have recognised it in the Molucca Islands as the amboina pocks [2], and by Marsden, who mentioned a native disease called nambi in his "History of Sumatra" (1811) [3].

Many years later, Charlouis, who described framboesia from Java as polypapilloma tropicum [4], gave one of the local native names as nambie. But up till now (1886) even Hirsch had been led from want of records to assume that the mainland of Further India had been little, if at all, visited by framboesia or yaws [5]. Ten years later a definite outbreak was reported from Assam [6], and yaws has quite recently been described as being very common in Siam [7].

In 1893, Dr. Brown described puru from Penang as

lupus contagiosus malayorum [8], and in an annotation on this important paper, Dr. T. Colcott Fox drew attention to the similarity of puru to yaws, but finally concluded that puru was the same as Oriental sore, and in 1897 the name was given as a synonym of that disease in Allbutt's "System of Medicine" [9]. It has since been shown that the appearance of some true Oriental or Delhi sores is by no means so characteristic as one would expect it to be from descriptions given in books [10].

Dr. Barker, of the Sarawak Civil Service, was the first to identify puru with yaws from Kuching in 1898 [11], and Dr. Connolly, of the Federated Malay States Civil Service, wrote a valuable memorandum in the same year, on the occurrence of yaws in Kinta, a district in the Federated Malay States [12]. Puru is given as a synonym of yaws in Scheube's "Diseases of Warm Countries" [19] (1903), and Dr. George Fernet (1904) has mentioned the puru of the Malay States under the heading of yaws [13], as well as Dr. G. W. Daniels, the Director, Institute for Medical Research, Federated Malay States, who has included it among the commoner diseases of Malays [14]; but with these important exceptions there are few, if any, direct references to the prevalence of the disease in the Malay peninsula.

THE ETIOLOGY OF PURU.

The true infective agent of the disease has not yet been recognised, and in a review of the etiology of puru, little or no support can be relied upon from any in-patient hospital statistics. Cases either under the name of puru or of yaws are seldom included in the returns of the Federated Malay States hospitals. The reason is that although the Malay native attends readily as an out-patient at any convenient and charitable dispensary, or possibly clamours for medicine on the visit of a European to his village, yet, notwithstanding the many opportunities for further improvement offered by European hospital treatment, the peasant fails to this day to be attracted by the benefit of treatment in a hospital ward, and generally applies for admission in a spirit of tolerant curiosity and in a desultory fashion, which is merely the effect of a momentary enthusiasm or the result of a personal attachment.

Under these circumstances it is impossible to collect hospital statistics which are of any great value. There is no medical literature. The only knowledge is that of the individual. The Malay medicine man (bomor) and the witch doctor (pawang) is for the most part but a native magician or a veteran wiseacre. They say naively that puru (literally a sore), like small-pox, comes from the smoke of hell fire! I have obtained, however, a good deal of general information from these native physicians.

Age.—Puru is one of the most common diseases of Malay children, but it is rare among infants; and it is, I think, seldom seen as early as the eighth month of life.

It is common to find puru in almost any Malay village (kampong) among little children who—although probably still at the breast—are able to walk alone and are exposed to contagion. The disease is not, however, confined to children, and may occur at any

age, except at birth. Out of fifty individual cases noted in the out-patient registers of the Duff Development Company's hospital at Kuala Lebir in the interior of Kelantan (from July, 1903, to July, 1905), twenty-four were children whose ages ranged from four to twelve years. The others were all adults who applied for relief mostly during the first year of the establishment of the hospital (1903), suffering from the later manifestations of puru of the foot.

Sex.—Puru appears to attack either sex with equal frequency, but in adults lesions of the foot are more common among males.

There is a variety called puru kochi (literally, Cochin China sore), which is said by Malays to attack the genital organs only, and to be more common among the female sex, but not necessarily confined to women. Dr. C. W. Daniels has suggested to me the possibility of puru kochi being akin to sclerotising granuloma of the pudenda. It is rare, and has not yet come under my personal observation.

Race.—The permanent native population suffers out of all proportion to the many inhabitants of the native states of the Malay peninsula. It is no exaggeration to say that at least 90 per cent. of the Malays in Kelantan are attacked by puru. Europeans appear to be exempt, but I have seen it among Chinese, Javanese, Siamese, and more rarely in Sikh and Dyak settlers. In the Federated Malay States it appears to me to be uncommon among Tamil immigrant children. I have seen it among the wild aboriginal inhabitants (Sakui-Semang) of Kelantan. It is common among them, and in the Kuala Lebir district is known in their dialect by the name of "choh."

Heredity.—In this disease heredity has apparently no influence. Children are never born with puru, even if one or both of their parents suffer from the disease at the same time. Puru is never seen during the forty days of the Malay puerperal state. There is no evidence, in fact, of congenital puru among Malays, who hold that the disease is always acquired. Abortions as the result of puru are almost unknown, unless during a very severe attack. Intermarriage and consanguinity do not seem to have any influence. Among hereditary antecedents there are no diseases from which Malays commonly suffer which seem to have any relation to the etiology. Tuberculosis is, I think, on the whole, as infrequent as leprosy among the country people. Lupus appears to be unusual in the Federated Malay States.

Physical Geography.—The Malay peninsula lies between the Straits of Malacca on the west and the China Sea on the east. It is made up of a number of native states, which are divided into eastern and western by a range of mountains which runs like a backbone nearly through its entire length. The height of the various peaks of the range varies from 3,000 to over 7,000 feet above sea-level.

The most important of these states are under British protection. They are the States of Perak, Selangor, Pahang, and Negri Sembilan, which were confederated in 1897, and have since been known as the Federated Malay States. They are situated in the centre of the Malay peninsula, and are bounded on the north and north-east by Province Wellesley and the Malay States of Kedah, Patani, Kelantan, and Trengganu;

on the south by Malacca and the State of Johore; and on the east and west by the China Sea and the Straits of Malacca respectively.

The population of the Federated Malay States numbers approximately 665,000 persons.

Kelantan is the most important of the other Malay states. It approaches Siam, being between lat. $5^{\circ} 40'$, and $6^{\circ} 20'$, north. It is bounded on the north by the Malay Straits of Legeh and Patani—dependencies of Siam adjoining Singgora, the southernmost point of the kingdom of Siam.

Climate.—The Malay climate is hot, moist, and very equable, making the peninsula a hotbed for fostering parasitic diseases of the skin, especially tinea imbricata, which is indigenous among many others. The average mean temperature in the shade may be said to be—maximum from 85.0° F. to 88.0° F., and minimum from 70.0° F. to 72.0° F. The highest maximum may be taken at 96.0° F., and the lowest at 68.0° F. The rainfall is large; over 100 inches per annum is the rule in most Malay states. Any division between wet and dry seasons for the year is very indefinite.

Geographical Extension.—As regards the Malay peninsula, puru is probably universal, although it may be more common in some places than in others. It occurs in all the states of the Federation, especially in Pahang, and is very prevalent in Kedah and Kelantan. It has been observed as far north as Legeh and Patani. In Trengganu puru is said to be even more abhorred than small-pox, on account of its persistent and chronic nature.

Hygiene.—The personal hygiene of the Malays is good. Country people bathe at least twice a day, but there is often much to be desired in the cleanliness of their attire. Children at the age at which puru is common wear little or no clothing.

Social position has probably no influence at all as a predisposing cause of puru among Malays. In Kelantan it is as common in the dwellings which form the native palaces as among the cluster of huts which make up the smallest hamlets. His Highness the Rajah of Kelantan, for example, has suffered from puru as a child, and the princes frequently contract puru.

The hygienic conditions of Malay life are similar, however, both in the high-born and in the low-born native as regards house accommodation. The sanitary condition of nearly all their houses is bad, and, although they are raised from the ground, they are ill-drained, ill-lighted, ill-ventilated and ill-cleaned. The daily household slops (mostly dirty liquid refuse from cooking) are thrown through loose bamboo floorings and allowed to soak into the ground beneath, so as to form a permanent slush under the kitchens. On the other hand, in the rural districts, where for the most part puru is very prevalent, it is very often common for natives to dwell upon bamboo rafts, which are made in the form of house-boats. The mass of the Malays, in fact, live either on rafts or in comparatively small huts built along the banks of the rivers. The Malay states are well watered by innumerable rivers and streams, and it is fortunately seldom necessary, therefore, to store water in this part of the East.

The only instance of the bad effect of stored water

in the Federated Malay States is, I believe, an epidemic of zinc poisoning which occurred in Pahang in 1900 among a half company of Sikh soldiers, which might have been attributed to the climatic effect on the corrugated iron roof from which a supply of rain-water was derived [18].

Preceding Illness.—At first sight puru apparently possesses an analogy to syphilis, but it is never thought by Malays that there is any affinity between these two diseases. There are many specific characters by which to distinguish them. Neither is a protection from the other, nor do they vary in inverse ratio. It is only a previous attack of puru that protects the individual from a recurrence of puru.

It is fitting to mention here that—making due allowance for many errors in the definitions of Malay nosology—many of the manifestations of venereal disease, as it occurs among dark races in warm climates, are well known to Malays.

Gonorrhœa is generally known in Malay as *sakit kencing* (lit. *sakit*, sick, and *kencing*, urine), or as *karang*.

Venereal buboes are referred to in many states as *mangga*, which literally means a mango. Curiously enough, the Chinese also call them *suai* or mangoes. Syphilis is known in Kelantan as *seduwan* or *seduwan sundal* (*seduwan*, a bad disorder; *sundal*, a bare-faced harlot), or in other places as *sakit prempuan* (*prempuan*, a woman). Three stages of *seduwan sundal* are recognised: (1) The original manifestation in man or woman on the genital organs; this is followed by (2) *seduwan bunga* (*bunga*, lit. a flower or pattern on anything), which attacks the gums and face, and is supposed by Malays to be due to infection (*uwap*, lit. vapour or steam); and (3) *seduwan angin* (*angin*, lit. wind), which especially affects the joints and bones.

The term *stong* or *restang* is commonly applied to destructive ulceration of the nose, such as occurs in tertiary syphilis. These diseases are all of common occurrence.

Other Observations and some Native Ideas.—The contagion of puru is well known. Malays say that children who play about together catch it from one another, but though two or more children in the same family may contract puru at the same time it does not necessarily run through the whole family. A second attack is said never to occur in the same person. Many hold that a kind of immunity is established in later life by the occurrence of the eruption in a rotation of three crops before the age of 3 years.

Isolation is never thought of, but natives avoid contact with the discharges of puru, and do not care to eat with people who may be afflicted with the general eruption. It is thought to be unwise to bathe immediately below any one suffering from puru of any kind, and many Malays are careful to bathe up stream, or away from people who are engaged in washing their sores or those of their sick children at the time.

Deliberate inoculation is never practised among them. The attack frequently follows on some slight scratch or abrasion, but it is said that the sores of the Malay *kudis* (lit. scurf), a kind of generic name given to ulcers as well as to scabies, or *kudis gatal* (*gatal*, to itch), and other sores of like appearance, are liable, on occasion, to take on the characters of puru sores.

Leech-bites, although very common in jungle districts, do not receive much attention in this connection, but there is a belief among some Malays that the sores caused by contact with the fresh “getah,” or live sap of a common fruit tree called in Malay *pokoh machang* (the horse mango, *Magnifera foetida*), is a ready vehicle for inoculation by puru should there happen to be cases in the neighbourhood.

Sores on the lips and about the mouths of children may often be caused by eating the acid fruit of this wild mango. The juice of the durian blossom (*Durio zibethinus*, L. *Malvaceæ*) is also blamed in the same way. These trees, however, are seldom avoided in consequence. Puru is well known to attack people both before and after they have suffered from small-pox. Small-pox is common in the uncivilised states, and educated Malays in the Federated Malay States often attribute the decline of puru (in Selangor, for example), as well as the apparent immunity of Europeans and their children, to the fact that, as a rule, all European residents and their children are more or less well vaccinated in childhood. Malay children, however, who have been well vaccinated readily contract puru, and it is more practical to account for the apparent immunity of Europeans and their children by explaining that they are not very much exposed to the contagion of puru.

It would be exceptional for European children to have many native playmates in places where puru was common. As a matter of fact, most Europeans, by reason of the refining influence of civilisation, are reluctant to come into personal contact with the loathsome-looking sores of puru. The advance of civilisation among the Malays in this respect, together with the influence of modern sanitation, should tend towards the check of the disease. In the civilised states of Selangor and Perak puru used to be far more common in the towns than it is at present.

Malays do not appear to associate the idea of flies or insects being possible agents in spreading puru, and although their expression, “*bagi lalat chari puru*” (as the fly seeks the sore), is used in conversation, it is applied more in the sense of the English saying, “Where the carcase is there will the eagles be gathered together.” The common house-fly (*Musca domestica*) is not very prevalent.

Malays live rather poorly, the peasants mostly on boiled rice and dry salted fish, but diet does not appear to have much influence in the causation of puru. Native settlers, especially Chinese, favour a far more liberal diet.

In Kelantan, the practice of eating a home-made condiment of badly preserved sea-fish is very common. It is made by pounding two kinds of small fish (in Malay, *bilis* and *kikih*), salting them, and adding a little water. The young fish are chosen, and the raw preparation is kept for forty days, and when in a state of decomposition is ready to be eaten with rice. It is called “*budu*” and “*peda*” in Pahang. Dr. Hanitsch, the Curator of Raffles Museum, Singapore, has kindly identified these fishes for me. The larger of the two, *ikan kikih*, is *Equla edentula*, which is distributed in the Red Sea, Seas of India, Malay Archipelago and beyond. The smaller, *ikan bilis* (lit., *ikan*, a fish), is *Engraulis indicus*. It is very common about Singa-

pore, belonging to the family *Clupeidae*, which comprises herrings and sardines.

Some Malays in Kelantan attribute the prevalence of puru in this state to the comparatively large amount of budu which is consumed by Kelantan Malays. The custom, however, seems to be peculiar to the eastern and northern states and to be in no way responsible for the origin of puru.

In Kelantan a very widespread and fatal disease occurs among fowls. It is characterised by an eruption about the beak and eyes, often leading to blindness. I have not, however, been able to trace any clinical resemblance between it and puru as it occurs in human beings.

THE CLINICAL CHARACTERS OF PURU.

Puru is universally recognised by Malays as being a specific disease. They have carefully observed the constant groupings of its symptoms and have given differential terms to its various manifestations. The most prominent of the well-marked clinical characters is the appearance of the eruption of the puru sores as it occurs in Malay children.

The disease attacks otherwise healthy and robust children, and observers with any experience of puru cannot fail at sight to recognise the eruption of puru sores in Malay children owing to its constant and uniform appearance. In the later stages of the disease it is not so easy to speak so definitely nor to recognise the sequence of the symptoms.

There is a stage of incubation, efflorescence, decline and sequel, but Malay children are seldom seen during the early stages of puru. In adults, again, the eruption of sores is more likely to be seen among foreign native settlers. Malays have mostly experienced it in childhood. The incubation period is therefore difficult to determine. It is given off-hand by most Malays as being twenty days. The attack is generally preceded by an ill-defined constitutional disturbance which causes some slight fever, as well as rheumatic-like pains in the bones, back and limbs. These symptoms are occasionally delayed or suppressed through chills, and it is said that the prodromal pain in the bones is then very pronounced and the backache equal in severity to the pains of small-pox. The joints in such cases are tender and swollen quite early in the disease.

The initial puru breaks out all over the body as a miliary papular eruption ("ketut" in Malay), and often in successive crops. It is attended with great itching, so much so as to give occasion for the Malay proverb, "Orang yang puru gatal tubohnya neschaya menggaru juga kerja-nya" (A man whose body is itching with puru will always be engaged in scratching it). I doubt, however, if the itching is sufficient to keep Malays from sleeping. Children often complain of feeling chilly at this early stage of the disease; they are feverish, peevish, and disinclined to bathe. The efflorescence of puru, known in Malay as the "bunga" (a blossom), develops gradually from the primary papular eruption. The "point d'appuie" is most often at some simple scratch or small sore from which springs what is known in Malay as the "puru ibu," or mother sore. This is formed by a combination of several papules and is generally the largest sore as well as the best developed and the most persistent. It is most

often found below the waist, on the foot, leg, or thigh, but it may occur on the wrist or hand. This particular clump of papules may assume a horseshoe shape, or may develop into a large sore, as in fig. 1.

Malays always fancy the "puru ibu" to be the initial sore, and they often think it is a misfortune if it should disappear early in the disease. It is often the last sore to heal. Malays also think that it is impossible to arrest the development of the "puru ibu" and so prevent puru from spreading over the body and subsequently affecting the joints.

The "bunga puru," or efflorescence of the disease, originates from the papular eruption and seems to spring up like seed planted, as it were, beneath the skin and to grow up into a crop of tubercles which gradually bursts through the skin and expands into a number of discrete lesions, which ultimately become the typical clinical features of puru. Many of the original papules, on the other hand, involute and subside. There seems to be no reason (such as irritation from scratching, &c.) for some of them to develop into puru sores while others, and perhaps the majority of them, disappear. As they develop they are moist by reason of a glairy, thin, scanty, but rather sticky discharge, and on cutaneous surfaces they gradually dry up and generally form sores which are covered with a hard, tenacious, dirty, yellowish crust. Puru sores at this stage are those which are most commonly met with. Pus, unless formed by irritation, is not as a rule found under the crusts, and in four or five instances I have found the discharge to be either alkaline or neutral to litmus paper.

The sores are scattered over the face, neck, trunk, and extremities. They are more or less disproportionate and vary very much—from a grain of maize to a betel nut, for example—in point of size. They are often flattened out, but always seemed to be indolent and insensitive. By soaking of the crust of a small and rather old typical sore the reddish and roughly granular contour of the swelling may be exposed. It is not unlike a raspberry in appearance. Multiple and typical examples may be seen in the armpits and on the penis.

Irregular-shaped sores are very common at the angles of the mouth, at and about the nostrils, on the buttocks, and about the anus and genitals. When the eruption is well out the general health is practically unaffected, particularly when the sores have dried and scabbed over. They seldom ulcerate to any extent. I have never seen them transformed into "sloughs."

The disease does not attack the viscera, so far as can be judged without the aid of *post-mortem* examinations; the nervous system and the larynx appear to be exempt. There is certainly no specific affection of the eye in puru; deep lesions of the tongue do not occur, but the sores are said to attack the mucous membrane of the mouth. I think this, however, must be rare. The symptom is known as "guwan" or "serawan" in children. It has possibly been confounded with "thrush." The occurrence of an attack of puru for the first time in old age is said to be grave.

Puru sores heal very slowly on their own accord, and when they are at last beginning to decline they

shrink and gradually disappear, leaving either dark purplish transient strains or a few dark superficial scars.

The disease is of long standing; it frequently lasts for one or two years, but often for a much longer period. Sometimes the initial papular eruption becomes scurfy ("puru sekam"), and in other cases it may develop in places into a serpiginous eruption ("puru kretas"). When the eruption comes out slowly constitutional symptoms ("sengai puru") are complained of, such as malaise, simple periostitis of the long bones, and painful swelling of the wrist, fingers, and other joints. These symptoms are not at all uncommon in adults. During the decline of the disease, reminders in the shape of tiresome sores may crop up long after the original sores have ceased to recur. This is, I think, especially noticeable with sores of the foot, which are very common in adults who have suffered from puru in childhood. They generally occur on the sole and are very painful until they have burst through the epidermis. The pain is said to be much aggravated in the bare-footed native by contact with the dung of the buffalo and chicken. In Kelantan they are especially common during the durian (the thorny fruit) season in July and August, and for that reason, I believe, are called "puru durian." These foot sores are also seen in children.

A kind of xeroderma, or keratosis of the skin, as shown on the hands in fig. 2, also occurs on the foot, and is ascribed to puru. In appearance it is like dirty parchment paper, but the dry skin frequently cracks and causes painful fissures. This must not be confounded with the common affection of the feet, known locally as "burok chelapah" (lit., burok, rotten; chelapah, soiling by the tread). It is due to walking barefoot on gravel or sand.

Although puru as a disease is liable to be very persistent and recrudescant, Malays never acknowledge any lesions of deep nature, such as nodes, chronic dactylitis, chronic arthritis, and deep ulcers, as being sequels of puru. Lesions of the kind shown in fig. 24 and Plates XXXIX. and XCI. of the New Sydenham Society's Atlas [15] are very common among Malays. I do not think, however, that in the case of the Malay peninsula one is justified in attempting to fit these facts into a clinical description of puru. They appear to me to be manifestations of syphilis.

(To be continued.)

THE ANATOMY OF THE BITING FLIES OF THE GENERA *STOMOXYS* AND *GLOSSINA*.

By Lieut.-Colonel G. M. GILES, I.M.S. (Rtd.).

(Continued from p. 102.)

THE distinguishing generic characteristic of *Stomoxys* is, however, the form of the proboscis, which, though presenting a strong general resemblance to that of *Glossina*, differs so markedly in outline that it can be recognised at a glance.

The organ is shaped like a radish, with a bold curve, convex on the dorsal aspect, and is slightly swollen at the tip. With the exception of the ends of the labella, which are clothed with long thin hairs, the

surface is almost nude. It is connected with the lower part of the face of the insect by means of a soft membranous piece consisting of the combined bases of the labium and maxillæ, and bears on its dorsal aspect, close to the face, the short, single-jointed

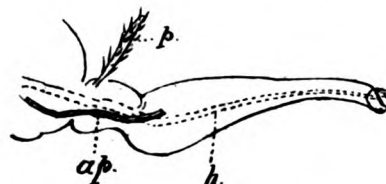


FIG. 13.—Profile outline of proboscis of *Stomoxys*. *p*, palp; *h*, dotted line indicating position of hypopharynx and labrum; *ap*, apodeme or sclerite which articulates with the fulcrum and serves as a jointed point of support to the proboscis. Semi-diagrammatic.

maxillary palps. This soft basal portion is about a quarter the length of the main radish-shaped part of the organ, and its length and flexibility permits of ample motion in flexion and extension, and to some extent also of protrusion and retraction, the necessary stability of the radish-like part being afforded by a pair of slender chitinous rods, the furca, which articulate with the fulcrum, at their proximal ends, and distally, with the bases of the lancets.

Through the axis of this flexible basal portion runs a chitinous tube, continuous behind with the buccal cavity, and in front with the groove of the lancet, which in this insect consists of the labrum only.



FIG. 14.—Head of *Stomoxys* in profile.

The above rough sketch gives a fair idea of the organ in the position it is usually carried by the insect, but the basal portion is often flexed backwards almost against the base of the head, and on the other hand the trunk portion can be extended so as to almost touch the antennæ.

A glance at the profile outline below shows that it would be difficult to plan a sheath for the lancets less suited to act for itself as a piercing organ. The labella form an ostentatiously blunt extremity to the organ, and are furnished with delicate hairs and elaborate tactile organs, while the abrupt thickening of the basal fourths makes it clearly impossible that it should ever act as a rapid piercing organ, if, indeed, it could be in any way possible to employ it as such. No boring instrument that I know of, devised either by Nature or by man, has this form, and when, for want of a better

tool, one is driven to try to use a piece of steel of this shape as an awl, one at once finds how utterly unsuited it is for the purpose. Let any one who doubts this try to sew leather or canvas with an ordinary packer's needle, which is efficient for the workman's purpose, merely because the sacking he works with is of so open a texture as to be almost a net, and yet the tool is better shaped than the proboscis of *Stomoxys*, as would soon be seen if one tried to sew sacking with a needle so shapen. Those who have been driven by emergency to use an ordinary sewing needle for suturing the human skin will fully appreciate the force of these arguments, though a sewing needle has a far more delicate point than the proboscis of this fly, and the needle, for strict comparison, should have its point broken off. The labrum, on the other hand, which has a point fashioned exactly like that of the ordinary and very business-like hypodermic needle, is as admirably adapted for piercing as the labium is the reverse, as may be seen from the accompanying camera lucida outline of the two organs drawn from a fly in which the labrum happened to lie separate from the sheath.



FIG. 15.—Outline of head of *Stomoxys* seen from side and rather from above.

Let us now examine more closely the structure of this organ. The proboscis in the ordinary resting position of the parts as seen in the living insect shows nothing but the labium, or lower lip, the function of which, as already noted in a preliminary communication to this Journal, is, I maintain, simply that of a sheath to the true piercing apparatus. The main part of this consists of a radish-shaped mass, already sufficiently described, and this supports a pair of small lobular organs, the labella, which, apart from the relative proportions of the parts, resemble the larger expansions which are so familiar to us in the favourite popular microscopic object usually labelled as the "tongue of the blow-fly." These lobes are obliquely articulated with the slightly constricted trunk of the proboscis, and in the fresh state can be made to separate by pressing the proboscis down on an object slip or other resisting surface. When in this position, it is needless to say that the labella make the labium even more obviously impossible as a piercing organ than when folded together in their ordinary posture of rest.

If we now proceed to dissect the separated proboscis it will be found that it is not difficult to separate the black outer coating, except from the labella, and that when this is done, we are left with a delicate plate of chitin (sclerite) which forms a sort of median antero-posterior septum, and on either side a great mass of muscle which takes origin from the chitinous furca,

which just reach up to the beginning of the thickest part or bulb of the proboscis, and is inserted into the anterior part of the median sclerite by tendinous fibres of varying length. Hence if the proboscis be detached by cutting it off immediately behind the bulb the muscular mass separates from the containing integuments with the greatest facility owing to its being left quite without hinder attachments. Behind, however, there is nothing to prevent the median sclerite from sliding back between the furca.

If we now examine a specimen from which the soft parts have been removed with caustic soda, it will be found that the outer skin, in spite of its blackness and deceptively solid appearance, is thin and flexible, and is, moreover, wrinkled transversely at fairly regular intervals. These transverse folds run almost transversely round the basal part of the proboscis, but towards its extremity, run rather forward on the ventral side to meet together in broad V's. These transverse lines give to the entire organ a close resemblance to a leech, which is much heightened by the remarkable similarity of general contour, and it is impossible to interpret them in any other way than that they are the outcome of habitual infolding which, exactly as in the leech, permits of the whole structure being shortened.

If we now examine a transverse section of the organ it will be found that it consists of a solid conical mass, the anterior side of which is grooved with a narrow rabbet, the depth of which, however, is not more than

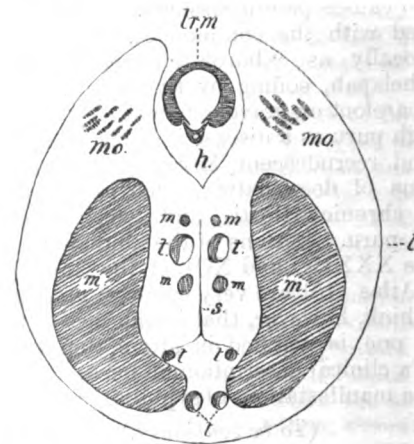


FIG. 16.—Transverse section of proboscis of *Stomoxys* at about mid-length. *h*, Hypopharynx; *l*, labium; *lrm*, labrum; *m*, muscle; *s*, median sclerite; *t*, tracheae. Camera lucida, semi-diagrammatic.

one-third of the thickness of the cone. Dividing it into two lateral halves is the median sclerite which is stouter on its ventral than on its dorsal edge, and lies immediately under the skin of the groove dorsally, while the stout ventral margin has attached to it two delicate septa which run off on either side to the great muscular masses and serve to separate the ventral median from the two great lateral air sacs. The entire width of this sclerite is little more than one-third that of the diameter of the cone, and as its thin dorsal edge is close under the rabbet, while the

ventral edge is almost a third of the diameter of the organ from the ventral integuments and separated from them by the great ventral median air chamber. Lying on either side of the axis of the cone are two great tracheæ which break up in front into branches which appear to open into the two antero-lateral air sacs. Behind and in front of each trachea are extremely slender muscles, the hinder rather the thicker, the function of which I am unable to make out, but conjecture that they are in some way concerned in keeping the crease between the labellæ from unfolding under the air pressure of the pneumatic sacs. In the dorsal portion of the section within the alæ forming the sides of the rabbit are seen a number of obliquely divided muscular films. There are two sets of these which serve respectively to separate and to bring together the labellæ; so with the difference that the prehensile lobes of the labella are lateral and symmetrical instead of different and antero-posterior, the whole proboscis presents some resemblance to that of an elephant, though the labella are, of course, relatively far larger. What purpose a pair of soft, hinged flaps can serve, when considered as the point of an awl, is difficult to understand, and it is for those who assert that the function of this elaborate mechanism is simply to pierce the skin, as a bradawl is driven into a plank, to show what may be the object of all this complication, and what may be the function of the various muscles and other parts concerned.

A minute description of even the external anatomy of the labella would alone occupy a lengthy paper, for

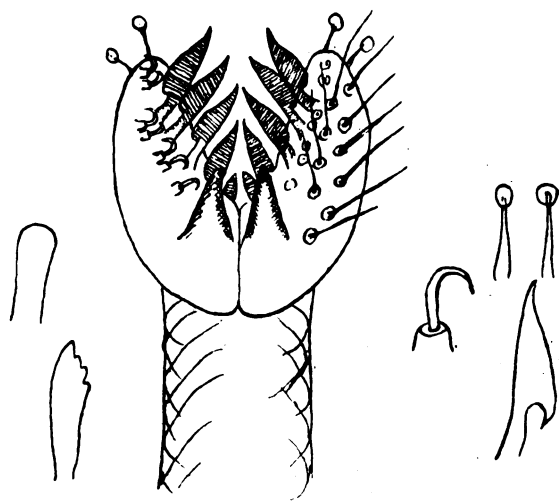


FIG. 17.—Labella of *Stomoxys* seen from ventral side to show the rank of large teeth. To avoid confusion, the complicated ranks of plates behind them are not represented, and only a couple on each side of the pellate hairs of which about a score are scattered over the end and sides of each labellum. On the left side is shown the rank of grapple hooks, and on the right the position of these is only indicated by small circles so as to show better the double rank of long bristles.

it is provided with so great a variety of hairs, plates and sense organs that it is extremely difficult to condense an adequate account of it into moderate limits. Internally it is simple enough, the entire

space, with the exception of some muscular fibres which are inserted into the bases of some of the larger plates or teeth, being occupied by a large air sac continuous with those of the main trunk of the proboscis, so that the point of this reputed borer is formed by an air cushion.

Viewed ventrally, with the labella slightly separated, it will be seen that the most prominent structures are a row of strong leaf-shaped blades or teeth which project inwards and forwards towards each other, so that in the natural position of rest they are folded together and cannot engage the skin of the blood-yielding animal except when the labella are spread out to full expansion. They are four or five in number on either side (I am not sure of the hindmost, which may belong to another rank of plates), and are the only at all powerful teeth that are to be found, though it is difficult to see how they can effect a sufficiently large wound to admit of the rest of the structure following them. On the other hand, it is easy to see that they can form efficient holdfasts if the labella are pinched together after they have entered the skin when they have been applied to it with labella expanded.

Outside these is a row of very obvious grapple hooks. These are arranged in pairs, with the exception of the hindmost, which is single, each pair being opposite an interspace between the leaf-shaped blades. Finally, outermost of all, is a double row of rather long, stiff bristles. Quite behind, on either side of the fold between the labella, is a large papilla. The whole of the tips and outsides of the distal third of the labella is sprinkled with very peculiar pellate hairs of extremely delicate structure. There are a score or more of these on each, but a couple only have been drawn to show their relative size, as to do more would needlessly confuse the figure. Their function is probably sensory, and it is conceivable that they may be gustatory organs, as the membrane of the little shield at the end is excessively delicate. From their form and delicacy it is obvious that they would never outlast the labella being once forced into the skin.

To obtain an idea of the complex system of plates and structures behind these it is necessary to make a dissection so as to clear away one

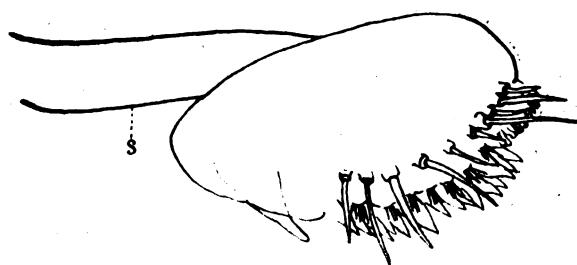


FIG. 18.—Side view of the end of proboscis of *Stomoxys*, the integument and muscles being removed to show the median sclerite.

labellum, and in doing so, by clearing away the integuments of the supporting trunk, it is easy to establish that the true support of the labella is the median sclerite (S) already described. When this

has been done it will be seen that inside the large leaf-shaped blades are two or more ranks of extremely delicate lancet-shaped structures. Next to these a row of tufts of short dense bristles, and inmost a rank of stout bristles. On the most anterior part is a dense mass of minute hooks. Personally, I regard these curious structures as having the function of sufficiently abrading the surface to admit of the character being tested by taste, but there is nothing whatever in their size and form, or in the fact of their presence, to suggest that they are in any way concerned in any deep piercing of the skin of the animal that yields blood to the fly, for "teeth" of this sort are to be found on the labella of all Muscidae, such as the common house-fly, and which certainly are quite incapable of doing anything more serious than of licking the surfaces of what they feed upon.

I cannot give the exact reference, but if any one cares to look up the files of *Science Gossip* of the early eighties, he will find a series of very interesting papers on these teeth of flies, which are illustrated by some very beautiful coloured plates, and will find that many of the most harmless flies have much more formidable teeth than those with which *Stomoxys* is provided.

(To be continued.)

RHINO-PHARYNGITIS MUTILANS.

By C. W. BRANCH, M.B., C.M.Edin.

Medical Officer, Colonial Hospital, St. Vincent, B. W. I.

UNDER this title, in the JOURNAL OF TROPICAL MEDICINE for February 15th, 1906, Dr. Leys describes a condition which he suggests is a distinct disease. As one with some experience of practice in the Tropics and of this particular condition, I wish to raise a protest against this manufacture of new diseases out of the manifestations of syphilis.

A mere pathological entity should not be put forward as a disease *sui generis*. By this process we have had several diseases created out of tuberculosis. Syphilis of the nerve system has provided locomotor ataxia, general paralysis, &c. But perhaps the most fertile field for the discovery of new tropical diseases is syphilis of the skin.

Considering the incalculable importance to the human race of the recognition of syphilis, and the difficulty as yet of confirming diagnosis by any certain test, it is most inadvisable to claim independence for any condition, which may reasonably be attributed to syphilis, until its etiological individuality can be established.

Far better is it to treat everything as syphilis than to miss the diagnosis of half the cases of syphilis. In the Tropics, at least, this is true, where perhaps two-thirds of the sickness is syphilis.

This destructive rhino-pharyngitis is extremely common in some parts of the West Indies. Those of us who do not attribute it to syphilis call it, with Dr. Rat, a tertiary of yaws.

Of all works on yaws, that of Dr. Rat is perhaps the best. He is a careful and conscientious observer, but, as can be seen by his laborious compilation of previous writings, he is limited by his reverence for tradition

and authority. This, however, could not detract from the accuracy of his descriptions, and I believe any one who reads his report with an open mind must see that, after all, yaws is only syphilis, as Jonathan Hutchinson says in his preface to Rat's report.

We are yet at the threshold of the arcana of syphilis, though the disease would seem to be as old as Pithecanthropus, and is clearly referred to in the Chaldean epic of Izdubar.

To understand this protean disease we must realise that various factors intervene to determine its manifestations. We can appreciate some of these. The races or individuals who tax their nerve systems suffer from nerve syphilis, which is comparatively rare among negroes.

The negro, with his highly specialised and active skin, displays an exuberance of eruptions rarely seen in Europe. The labourer exposed to injuries develops grave bone lesions. The women in St. Kitts, who habitually gratify the desire of sailors for *pedicatio mulierum*, get stricture of the rectum.

Some of the determining factors we have yet no knowledge of, others we can now guess at.

In yaws Castellani found a spirochæte morphologically identical with *Spirochæta pallida* and one or more of the *refringens* type. If we assume for the present that *S. pallida* has an etiological significance in syphilis, then the other spirochætes, or perhaps bacteria, may be the determining factors explaining the form of the yaws eruption.

I find in dirty sores, which have no apparent relationship to syphilis or yaws, spirochætes of one or more types which are identical with those I find associated with *pallida* in yaws. I think I can recognise sores in which these spirochætes will be found.

Some cases of another kind of sore have been observed associated with great œdema, but not inflammation of the legs. These are considered by myself and another man who has seen them with me to be due to tertiary syphilis. But they showed a marked identity and distinctness of features, and one finds another spirochæte in such swarms that the secretion consists almost entirely of the organisms, with very few pus cells.

Until the relationships of *S. pallida* and *Cytorrhynchus luis* to each other and to syphilis are worked out, or until some other certain test of syphilis is established, we have no right to foist a new disease on an already overburdened list. It must be possible, first, to exclude syphilis by the absence of some essential element.

Dr. Leys tritely calls attention to the disproportion in numbers of his cases and those of Dr. Rat in Dominica to the populations, and compares the frequency of syphilis of the palate and pharynx in a large European community. I noticed in a hospital report for 1902 (Colonial Reprints, Medical Reports, 1904), that destructive rhino-pharyngitis was exceedingly common on the leeward side of St. Vincent, while on the windward side destruction of the face took its place. Syphilis is equally prevalent on both sides of the island, but the land conditions are very different. The leeward side consists of deep ravines with numerous streams; there is dense tropical growth and combined heat and moisture.

These same conditions obtain in Dominica, in parts of St. Lucia, in Grenada, but not in Nevis nor Anguilla, and hardly at all in St. Kitts. Since he left Dominica Dr. Rat has been stationed in St. Kitts and Anguilla, and is now in Nevis. He has not observed the destructive rhino-pharyngitis in these places.

I have no doubt that Guam provides the conditions I have attributed to the leeward of St. Vincent, and shall be interested to hear from Dr. Leys, whose address is, necessarily, a changing one.

Syphilis and yaws are excessively prevalent in all West Indian colonies. Syphilis more so where yaws is not much accredited, as in St. Kitts and St. Vincent yaws, that is, the frambœsial eruption, is certainly, I admit, more prevalent under the same conditions referred to as favourable to rhino-pharyngitis.

Since reading Dr. Leys' paper I took the first opportunity of examining smears from a case of "leeward sore throat," as I have been in the habit of calling this condition. There was present in small numbers a spirochæte, other than *pallida*, in a scraping from the active edge of the ulcer. Pus from the surface did not show any spirochætes.

I shall pursue this enquiry as opportunities present. My suggestion is that it may be varieties of spirochætes which determine the form of the manifestation of syphilis in the case of yaws which is a secondary, and in rhino-pharyngitis mutilans and my "œdematous sore foot," which are tertiaries.

"Annales de l'Institut Pasteur," Paris, vol. xx, No. 1.

YELLOW FEVER AND MOSQUITOES.

Marcheux and Simond, in their second report of the French Yellow Fever Commission in Brazil, state that the *Stegomyia fasciata* is the only mosquito known which does not die after depositing its first batch of eggs. The female may lay several batches of eggs. Infection of the mosquito by heredity, although possible, is not general. *Stegomyia* do not feed on the black vomit, stools, or blood from the hæmorrhages occurring in yellow fever patients, unless compelled to by want of other food. The larvæ of *Stegomyia* developing in water in which dead infected mosquitoes have been thrown do not acquire the power of infecting man. In only one case was hereditary transmission experimentally proved, and the resulting infection of man was very mild. The *Stegomyia fasciata* mosquito, kept at a temperature of 68° F., loses power of infecting. The virus of yellow fever has been artificially transmitted from one mosquito to another in the laboratory, but successive passages proved negative. During the incubation stage of yellow fever, mosquitos cannot become infected.

"Bulletin et Memoire de la Société Médicale des Hôpitaux de Paris," February 1, 1906.

QUININE FORMATE.

Lemoine, G. H., advocates in the early stage of malarial attacks an hypodermic injection of quinine formate, 8 grs. in 1 oz. of water.

"L'Echo Médical du Nord," February 26, 1906.

TREATMENT OF ORIENTAL SORE.

Malméjac, F. As the result of experience at Biskra, the author finds the best local treatment is boiled distilled water at a temperature of 60° C. (140° F.). When crusts are present a stream of water is allowed to flow on these, especially into the edges and cracks. A dry antiseptic dressing is then applied. The treatment is repeated twice a day for a week, the crusts usually separate in two or three days; at the end of a week only one dressing a day is required.

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THE

Journal of Tropical Medicine

MAY 15, 1906.

A LESSON IN PRESERVATION OF HEALTH IN THE TROPICS.

REPORT OF THE PRESIDENT OF THE SAPELE SANITARY BOARD, DECEMBER 31, 1905.

SIR RALPH MOORE, when authorising the arrangements laid before him for sanitary work here, gave it as his opinion that three years should show whether the scheme to be applied was of value or not. These three years have now been completed, and I am glad to say that the experiments of making a Local Sanitary Board has proved a success, and further, to tell you that as a consequence a Local Board is about to be made at the town of Ko Ko further down this river, where Europeans are now also residing.

The supreme obstacle to systematic and continuous work in tropical West Africa is the rapid changing that sometimes takes place in the *personnel* which has to carry out the work, and it is for this reason that a Board composed of traders and officials was constituted, because it was seen that a Board would not "go away," and further, that it would have a continuous knowledge of the policy to be pursued. You will appreciate how great the change amongst individuals sometimes is, when I tell you that during the three years the Board has existed there have been five, I might almost say six, different administrators holding the office of High Commissioner, four different officers have acted as Divisional Commissioner, four others have acted as District Commissioner of Sapele, four others as Assistant District Commissioner, and, moreover, there have been three District Medical Officers here; finally,

with the exception of the doctor who started the whole scheme and has recently returned here, there is not a single member of the present Board who was also a member of the Board when it started.

The triumph of the Board is that not only has it lived through all these changes and done good work, but also that the local changes, with possibly one exception, were not due to ill-health.

The Board acts in four ways: Firstly, it acts by actually carrying out sanitary work, removing vegetation, surface water, &c.; secondly, it acts as an object-lesson, inspiring bush clearing, &c., even where a sanitary board does not exist; thirdly, it acts by interesting Europeans in sanitation, and as a corollary in quinine-taking as a preventive of malaria; fourthly, in proving the value of a sanitary board, it supports the arrangements for creating one at Ko Ko.

During the time the Board has been at work it has succeeded in dealing with almost the whole area of the reservation; and although parts of this area are not finally finished, yet a considerable portion around the European dwellings has been completed, and the work done will in future require only to be kept up.

The Board has tried many ways of employing labour; local boys, boys from the Benin country and the Ejor country have been tried, also prison labour, and the conclusion that has been come to is that no matter what labour is employed, it is best to give out the work as piecework, either to individuals or native contractors.

I have here certain figures gathered from the records of the Sapele District Medical Officers, and from them it will be seen that the healthiest time of the year here at Sapele used to be, and still is, the rainy season. This is the period of lowest maximum temperature. The figures, expressed graphically, show that the curve of the sick list falls as the maximum temperature falls and the rain curve rises. The sick list curve is now altogether so near zero that it is difficult to appreciate its undulations, but June, which is always one of the heavy rain months, this year had no European inhabitant sick during its entire length.

We are fortunate in having no death among the *bona fide* European inhabitants of Sapele for more than three years, this, though a thing to be thankful for, must not be considered too much, for that death will occur both at home and abroad we all know only too well. In the Blue Book for 1904, relatively a large number of deaths are shown under the name of Sapele, but these deaths occurred in people living in outlying parts of the district, and not to inhabitants of the reservation.

What these vital statistics mean, put commercially, is this, that for a cost of 9s. per month for each European of Sapele Reservation for the year 1905, his chances of being sick have been reduced from five and four-fifths times each year to one and two-fifths each year.

A new firm has commenced business on part of the land cleared and reclaimed by the Board, and I have reason to believe that the rent paid by it will be given to the Board to be expended in still further work. There is a lot still to be done; keeping down the vegetation is itself a labour like rolling a big stone up an endless hill.

During the incoming year, however, the question of disposal of refuse or water supply might, with advantage, be considered. In any event, I am confidently hoping the future members of the Board will be keen to maintain the record, namely, that in spite of an increasing European population the amount of sickness decreases, and that they will cause the Board to remain in the sound financial condition it has always enjoyed.

FRANZ STAHL, *President*.

Table showing Number of European Residents under Medical Treatment.

		(1st, before the Board. 2nd, after the Board.)											
		January	February	March	April	May	June	July	August	September	October	November	December
1st	1900	8	8	6	6	5	3	4	8	9	5	8	9
	1901	12	9	10	4	5	6	4	10	10	12	9	10
	1902	11	12	12	8	5	4	4	4	7	5	9	6
2nd	1903	7	9	8	10	8	12	6	5	6	4	5	3
	1904	5	3	3	2	3	3	2	2	3	5	3	4
	1905	3	4	1	4	4	0	3	1	3	1	4	3

Table showing Average European Population for the Year 1900-1905, including actual Number of Deaths.

		Population		Deaths	
1st	1900	..	..	14	2
	1901	..	..	15	1
	1902	..	..	17	2
2nd	1903	..	..	19	0
	1904	..	..	23	0
	1905	..	..	25	0

Balance Sheet of the Sapele Local Sanitary Board, December 31, 1905.

Dr.			Cr.		
	£	s. d.		£	s. d.
To balance on hand	26	12 3	By Bush	14	18 0
„ Special Government grant ..	75	0 0	„ Swamp clearing and bush ..	45	15 0
„ Rates on compound paid	67	10 0	„ River front and drain clearing	35	0 0
„ „ due ..	22	10 0	„ Sobo gang ..	1	10 0
„ Grant—part of fine paid by Messrs. Pin-nock, Ltd., for taking up cleared ground	25	0 0	„ Eddy—monthly	34	15 0
			„ Balance in hand	84	14 3
	£216	12 3		£216	12 3

Correspondence.

“HORSE-FLIES (TABANIDÆ) AND DISEASE.”

To the Editor of the JOURNAL OF TROPICAL MEDICINE.

SIR,—In my article under the above heading in your issue for April 2nd last, I unfortunately omitted to mention that in Algeria it has been shown by Drs. Edmond and Étienne Sergent, by means of experiments upon laboratory animals, that *Tabanus (Atylotus) nemoralis*, Mg., and *T. (Atylotus) tomentosus*, Macq., are capable of transmitting the trypanosome of the disease of dromedaries, called *Debab*, which occurs from Morocco to Syria, and more than decimates the Algerian camels. In most of the experiments transmission was direct, but in one case, in which six or eight specimens of *Tabanus tomentosus* were used, an interval of twenty-two hours had elapsed since the flies had

bitten an infected rat. Actual experiments upon camels do not appear to have been made, but the natives of North Africa always assert that the disease is transmitted by *Tabanidæ*, and camel-drivers declare that the two species mentioned above, which apparently are far more common in Algeria than any others, are especially dangerous to camels. The disease, which is almost invariably fatal, commits great havoc among animals that have passed the summer in a locality where horse-flies are numerous, but among others that have spent the time in a place where *Tabanidæ* are almost absent its incidence is slight *C.f.*, "El-Dehab Trypanosomiase des dromadaires de l'Afrique du Nord," by Drs. Edmond and Étienne Sergeant (*Annales de l'Institut Pasteur*, T. xix., January, 1905, pp. 17-48). My thanks are due to Dr. Edmond Sergeant for his kindness in drawing my attention to the very interesting and important paper in question.

I am, &c.,

ERNEST E. AUSTEN.

British Museum (Natural History),
Cromwell Road, London, S.W.,
April 28th, 1906.

Abstract.

CARRION'S DISEASE: VERRUGA PERUANA AND ITS BACTERIOLOGY. By Dr. M. O. Tamayo (*La Cronica Médica*, November 30 and December 15, 1905.) Translated by M. D. Eder.

Dr. Barton, in 1899, isolated a bacillus from the spleen in several cases of pernicious fever in Carrion's disease. He described the bacillus, pointed out its differences from the *B. coli*, and concluded that it was the specific causal agent of verruga peruana.

We have examined all cases of this disease that we have been able to find in the hospitals of Lima during the last few years; they number thirty in all.

Our studies confirm Dr. Barton's researches, in so far as that the organism he described is indeed frequently present in such cases. Clinically, the thirty cases may be divided into two groups:—

(1) Those where fever was the main clinical symptom. This comprises most cases.

In twenty of these cases bacteria were found in the blood during pyrexia, which, by their morphological and cultural characteristics, belong to the paratyphoid group.

In periods of apyrexia in most cases the blood did not contain the organisms (see Case 10).

(2) Those without fever.

In these cases no bacilli were found. Our cultures, whether made from patient's blood, from the juice of the warts, or fragments of these growths, remained sterile.

The bacteriological work consisted in:—

(a) Microscopic examination of the blood and fluids of patients.

(b) Cultures from the blood on different media (we used a sterile Pravaz syringe for withdrawing blood from the veins, the skin being previously carefully disinfected).

(c) Inoculation on various animals—guinea-pigs, rabbits, Chinese dogs (*Canis caribeus*), three horses, and one monkey.

(d) In fatal cases we made cultures from the blood

of the heart, spleen, liver, pulmonary veins, and from portions of bone marrow.

Pure cultures are easily obtained from the blood of febrile patients. The bacillus grows rapidly on peptonised broth, agar, gelatine, &c., at 37°. The blood does not arrest the growth of the organisms (Eberth's bacillus). No bacillus was found in the blood under the following circumstances:—

(i.) In the apyrexial variety, where other symptoms were prominent, *e.g.*, copious eruptions, progressive anæmia, arthralgias. There was no question here of the fever being latent.

(ii.) In slightly febrile cases.

(iii.) Transitory rises of temperature in cases that were running a typically afebrile course.

Inoculation experiments with pure cultures gave the following results:—

(1) A few drops¹ inoculated into the subcutaneous tissue of rabbits weighing 1,500 to 2,000 grammes frequently killed them, the animals dying with all the symptoms of acute septicæmia.

(2) Intraperitoneal inoculations usually caused death with *post-mortem* signs of acute peritonitis.

(3) In some cases intravenous injections did not cause the death of the rabbits. After a few days of fever and signs of septicæmia the animal recovered; there was at no time any eruption. When the animals were killed some months afterwards, no eruption, external or internal, was found, nor did we find any pathological condition, either recent or old.

Guinea-pigs are also very susceptible to inoculations. Intravenous inoculations produce a rapidly fatal septicæmia.

Dogs are more resistant. Intravenous injection of small quantities of a virulent culture give rise to fever which disappears in a few days. Repeated inoculations can be made until the animal becomes immune. The serum is then agglutinative for the same bacillus. Careful observation during many weeks showed the animals to be perfectly healthy.

Horses.—Injections of high potency and virulence were made into the jugular veins of three horses. Two recovered completely in a few days after having had some signs of a slight septicæmia. No granulomata or other effects appeared. The third animal died of acute septicæmia; it had received a large dose of a hypervirulent culture.

Small Monkey (Ateles ater).—Repeated inoculations with the blood withdrawn from the verrugæ, and with cultures of Barton's bacillus, gave no results. After a few days of slight septicæmic trouble he recovered perfectly, and is still in the Institute in complete health. His serum readily agglutinates the bacteria taken from the verrugæ.

To this experimental work we must add a few remarks on the clinical aspect of the febrile cases which is so very similar to that of typhoid fever. Note the general apathy, the dry tongue with its light band of fur, the tenderness over the epigastric and the hypochondriac regions. Diarrhœa is a fairly constant feature, and resembles in every particular that in enteric. The temperature chart is characteristic of enteric; there is at first a gradual daily rise; then a

¹ The vagueness is in the original.

ANALYSIS OF TWENTY-SIX CASES OF VERRUGA PERUANA.
(In four others the clinical notes are not obtainable.)

No.	Fever present	Eruption present	No. of red blood corpuscles (a).	Result of bacteriological examination	Result	History	Post mortem
1	Continued ..	Scanty ..	985	+	Recovery ..	Severe diarrhoea; headache; liver and spleen enlarged; insomnia.	
2	" ..	None ..	"	+	Died ..	Severe diarrhoea; prostration; articular pains; spleen and liver enlarged; severe anaemia.	
3	" ..	None during life—a few found in spleen post mortem	1,800	+	" ..	Severe diarrhoea; prostration; cephalalgia; insomnia	Few warts on border of spleen.
4	" ..	Discrete miliary	"	+	Recovered ..	Severe diarrhoea; vomiting; tender abdomen; albumin; anaemia.	
5	" ..	None	2,400	+	Died ..	Severe diarrhoea; vomiting; insomnia; arthralgia	Nothing special.
6	" ..	Miliary and nodular	1,900	+	Died of tuberculosis ..	Arthralgia; prostration; spleen and liver enlarged.	
7	Hyperpyrexia, 42° C.	None ..	"	Made post mortem from blood of heart +	Died ..	Laveran's organism found during life; diarrhoea; vomiting; complicated by malaria	Nothing special.
8	Continued ..	" ..	"	Post mortem +	" ..	Intense anaemia; epistaxis; diarrhoea; cephalalgia; articular pains spleen and liver +	" "
9	Remittent ..	Four days before death	1,700	+	" ..	Cephalalgia; arthralgic pains in bones.	
10	" ..	Appeared after Apyrexia	1,400	+	" ..	Cephalalgia; arthralgia; diarrhoea; liver and spleen enlarged. The eruption disappeared; the patient relapsed, dying in a few days.	
11	Present ..	None ..	3,500	+ (from heart)	" ..	Constipation; then diarrhoea	Negative.
12	Slight ..	Extensive nodular	"	Negative ..	Recovered ..	Subicteric tinge; liver enlarged; spleen not palpable; digestion normal; cephalalgia; arthralgia.	
13	Continued ..	None ..	"	Positive ..	" ..	Tender abdomen; diarrhoea; vomiting.	
14	None ..	Abundant	"	Negative ..	" ..	Negative.	
15	Slight ..	" ..	"	" ..	" ..	Anaemia; digestive apparatus normal.	
16	Continued ..	None ..	2,000	Positive ..	" ..	Diarrhoea; liver enlarged; insomnia; prostration.	
17	" ..	Extensive	"	" ..	" ..	The granulomata suppurred, and there was found in the pus the <i>B. paratyphoid</i> and a fluorescent bacillus.	
18	None ..	Four months' duration	"	Negative ..	" ..	Nearly the whole body was covered with the eruption; slight epistaxis.	
19	Very slight ..	Nodular ..	"	" ..	" ..		
20	Intermittent ..	" ..	"	" ..	" ..	Repeated blood examinations. Laveran's organism was not found.	
21	None ..	" ..	1,048	" ..	" ..		
22	" ..	Present ..	1,200	" ..	" ..	Severe epistaxis; diarrhoea; prostration; enlarged liver and spleen.	
23	" ..	Miliary ..	"	" ..	" ..		
24	Slight ..	" ..	"	" ..	" ..	Cephalalgia; pain in bones; three weeks after arriving at the endemic centre.	
25	None ..	Nodular ..	"	" ..	" ..	Negative.	
26	" ..	" ..	"	" ..	" ..	Pains in joints.	

(a) Thousands per cubic millimetre.

period of continued fever; finally, as convalescence ensues, the fever, synchronous with the attenuation of all the other symptoms, becomes remittent. The average duration of the fever is twenty-five to thirty days (Odriozola, "La Maladie de Carrion").

It must be noted that there is no connection between the fever and the order of the appearance of

the granulomata. Sometimes the fever ends just when the verruga appears; sometimes the reverse holds good—the verruga disappears and fever commences.

To sum up our results:—

(1) Barton's paratyphoid bacillus is found only in cases of pernicious fever of Carrion's disease.

(2) Inoculations do not give rise to verrugæ, but to a typhoid septicæmic state.

(3) Carrion's pernicious fever is a typhoid or paratyphoid disease, attacking the patients suffering from verruga.

(4) Barton's bacillus is not the pathogenic agent of verruga peruana.

(5) Barton's bacillus gives rise to a secondary infection occurring during an attack of verruga, which attack predisposes to the infection. This secondary affection has all the clinical characteristics of enteric fever.

Review.

THE MANAGEMENT OF A PLAGUE EPIDEMIC. By E. F. Gordon Tucker. Calcutta: Thacker, Spink and Co., Government Place. 28 pp. Illustrated. Price 1·8 rupees.

The substance of this concise book appeared in *Indian Public Health*. The object of the writer is to present in a readily followed statement the steps to be taken by a medical officer placed in charge of a town or district stricken with an epidemic of plague. The subject is dealt with under the following headings: (1) The Termination of the Period of Quiescence; (2) The Arrival of the Primary Infecting Agent; (3) The Stage of Sporadic Atypical Cases; (4) The Stage of Local Place Infection; (5) The Early Epidemic Stage; (6) The Fastigial Stage of the Epidemic; (7) The Stage of Decline; (8) The Stage of Residual Infection; (9) The Commencement of the Period of Quiescence and a Temporary State of Local Immunity. An excellent book, that will prove a great help to any medical man placed in charge of an outbreak of plague in any part of the world.

Drugs and Remedies.

TREATMENT OF BLACKWATER FEVER.—The Bipalatinoid, prepared by Oppenheimer, Son and Co., 179, Queen Victoria Street, London, E.C., for use in the treatment of blackwater fever, continues to give satisfactory results.

Full particulars have been reported upon no fewer than twenty-one consecutive cases of recovery, without a single death, and without sequelæ or complications of any form of urinary suppression. This experience is encouraging and unique, and we hope to hear of further cases in which this bipalatinoid has been used. It will be remembered that it was the Principal Medical Officer of British Central Africa who suggested the treatment to Messrs. Oppenheimer in the first instance.

"TABLOID": SODIUM CITRATE.—Messrs. Burroughs Wellcome and Co. have prepared a sodium citrate "Tabloid," grs. 2 (0·13 gm.), for use in cases in which either the mother's milk or cow's milk does not suit the infant.

The digestibility of cow's milk is greatly assisted by the addition of sodium citrate. The explanation of the

action which is commonly given, is that the acid caseinogen and the calcium salts of milk in presence of the gastric juice form a thick casein clot. If sodium citrate be added to the milk, it combines with the caseinogen to form a sodium compound less dense and more absorbable than the calcium caseinogen compound in the normal milk clot. The calcium salts in the milk unite with the citric acid of the sodium citrate and the resultant calcium citrate is diluted by the stomach contents and absorbed. Thus the introduction of sodium citrate increases the digestibility of cow's milk in a remarkable manner, allows the absorption of the calcium salts, and greatly enhances the food value of the milk.

Notes and News.

W. J. R. SIMPSON, M.D., F.R.C.P., D.P.H., Professor of Hygiene, King's College, London, and Lecturer in Tropical Hygiene at the London School of Tropical Medicine, has sailed for Singapore to serve on a Commission to enquire into and report upon the sanitary condition of Singapore. The appointment was made by the Colonial Office acting on behalf of the Government of the Straits Settlements. Professor Simpson's excellent work, whilst engaged on similar commissions in South Africa and Hong Kong, is fresh in our memories, and we anticipate equally brilliant results from the present Commission.

Surgeon-General James Pattison Walker, who died recently, at the age of 86, joined the Medical Service of the East India Company in 1845. He served with distinction during the Mutiny, and amongst other important positions he occupied the Chair of Hygiene in the Calcutta School of Medicine.

Whilst H.M.S. *Black Prince* was on view to the public, the ship was visited by 21,000 persons. No less than £1,100 was received for the benefit of the Seamen's Hospital Society and the Poplar and West Ham Hospitals.

Surgeon-General Spencer, I.M.S. (retired) has been appointed Honorary Surgeon to the King.

To remove rust from instruments, according to the *Pharmaceutische Zentralblatt*, rusty surgical instruments are (1) placed for twelve hours in saturated solution of stannous chloride; (2) rinsed in water; (3) laid in a hot solution of soda soap; (4) dried; (5) or rubbed with absolute alcohol and (6) prepared chalk. Another method is to lay the instruments in kerosene. As a preservation against rust, paraffin oil may be applied as follows: The instruments, after being dried and warmed, are laid in a solution of 1 part paraffin and 200 parts benzine. Subsequently the benzine is allowed to evaporate before the instruments are laid aside.

The British Association meet at York on August 1st. 1906.

ASSOCIATION OF MEDICAL OFFICERS OF MISSIONARY SOCIETIES.

The above Association was formed in March, 1904, on the initiative of Mr. W. McAdam Eccles, Dr. C. F. Harford, and Dr. J. N. Kelynack, and now includes, as members, medical representatives of practically all the foreign Missionary Societies.

The object of the Association is the discussion of subjects relating to the selection of missionaries as regards their physique and to all matters concerning the preservation of their health abroad.

Meetings take place quarterly at the various members' houses, and amongst others the following have opened discussions: Sir Patrick Manson, Dr. S. H. Habershon, Colonel T. H. Hendley, I.M.S., Dr. C. F. Harford, Mrs. Scharlieb, M.D., and Wm. McAdam Eccles, M.S., F.R.C.S.

PANAMA.

Deaths from Yellow Fever and Malaria, in the city of Panama, since 1884. Taken from Report of Department of Health of the Isthmian Canal Commission for July, 1905.

	Deaths from yellow fever.	Deaths from malarial fever.
1884	68	491
1885	174	687
1886	281	497
1887	259	481
1888	82	448
1889	33	249
1890	0	198
1891	17	178
1892	1	133
1893	1	142
1894	0	137
1895	0	138
1896	0	168
1897	45	203
1898	0	161
1899	87	190
1900	109	178
1901	5	134
1902	202	562
1903	51	178
1904	8	162
1905	27	97
Average ...	66	264

LIVINGSTONE COLLEGE.

On Thursday, May 31st, Livingstone College, Leyton, E., celebrates its Commemoration Day. The programme of proceedings is as follows:—

The chair will be taken at 3.30 by J. A. Simon, Esq., M.P. for the Walthamstow Division of Essex, unless prevented by his official duties.

An address will be given by James Cantlie, Esq., F.R.C.S., and by the Rev. J. E. Watts-Ditchfield, Vicar of St. James-the-Less, Bethnal Green.

A short statement as to the progress of the College will be made by the Principal, Dr. Harford.

Personal Notes.

INDIAN MEDICAL SERVICE.

India Office: Arrivals of Indian Medical Officers in London.
—Lieutenant-Colonel P. D. Pank, Lieutenant-Colonel J. Sykes, Lieutenant-Colonel A. C. Younan, Captain W. H. Kenrick, Captain A. T. Pridham.

Extensions of Leave.—Lieutenant-Colonel A. V. Anderson, 6 m., Med. Cert.; Major A. R. P. Russell, 4 m., Med. Cert.; Captain L. Hirsch, 5 m., Med. Cert.; Captain R. D. Willcocks, 4 m., Med. Cert.

Permitted to Return to Duty.—Lieutenant-Colonel H. Armstrong.

Postings.

Dr. H. A. Macleod to Civil Surgeon, Saharanpur.
Major G. Y. C. Hunter officiates as Superintendent, Central Jail, and Civil Surgeon, Montgomery.

Captain C. J. Robertson Milne, Superintendent Central Lunatic Asylum, Lahore, in addition to his other duties.

Captain L. B. Scott, services lent to Government of Assam.

Captain N. S. Wells, services lent to Jail Department, Bengal.

Colonel A. M. Crofts, at disposal of Home Department.

Captain H. Ainsworth to Plague Duty, Lahore.

Major G. B. Irvine, Civil Surgeon, Jhelum.

Captain G. E. Charles officiates, Prof. Anatomy, Lahore.

Leave.

Major R. J. Marks, privilege leave, 2 m. 24 d.

Lieutenant-Colonel W. Coates, Med. Cert. and privilege, 7 m.

Major A. H. Nott, furlough and privilege leave, 17 m.

Major R. H. Maddox, combined leave, 18 m.

DOMESTIC.

BIRTHS.

OXLEY.—At Seoul, C.P., on April 5th, the wife of Captain J. C. S. Oxley, of a son.

COLONIAL SERVICE.

J. B. Addison, M.R.C.S., L.R.C.P., is acting as Chief Medical Officer of the Seychelles.

*Dr. E. W. Blyden will terminate his five years' engagement with the Government of Sierra Leone on July 1st, 1906.

*Dr. J. D. Bolton, of Mauritius, has been appointed Government Medical Officer of the Dependency of Rodrigues.

R. Denman, M.R.C.S., L.S.A., D.P.H., Chief Medical Officer, Seychelles, is on leave.

A. Nicolle de Gruchy, M.B., C.M. Edin., Assistant Medical Officer, Seychelles, has been transferred to Southern Nigeria as Medical Officer.

G. F. Leicester, M.B., C.M. Edin., Assistant at the Institute for Medical Research, Selangor, Federated Malay States, is at present acting as District Surgeon in Selangor.

*Dr. A. J. McClosky, District Surgeon, Selangor, Federated Malay States, is on leave.

*Name not entered in the "Medical Directory" for 1906.

[Reference is made to the fact that the name is not entered in the "Practitioners Resident Abroad" list in the hope that all medical men abroad may see to it that their names are duly entered in this list.—Ed., J.T.M.]

Colonial Economic Notes.

ANTIGUA.—The area of the cultivation of cotton was considerably increased during 1905. Owing to deficient rainfall both the cotton and sugar crops suffered.

BARBADOS.—Cotton cultivation is extending. Banana growing has received a check, as no profits are being obtained; regular mails and proper cool storage in all ships can alone restore the banana industry.

BRITISH GUIANA.—It is proposed to appoint a Royal Commission to enquire into the condition of the Colony generally.

MONTSERRAT has had a record cotton crop.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Nature," December 25, 1905.

THE PULSE OF THE ATMOSPHERIC CIRCULATION.

Shaw, Dr. Few of those whose lot is cast in the regions south of the Equator which are swept by the "Trades" have any idea that there can be any connection between the force of the wind current and the weather at home in England. And yet the above very interesting and suggestive paper advances strong reasons for believing that such is the case. Dr. Shaw himself regards his hypothesis as "too speculative for an official report," but "too suggestive to be altogether ignored," and the gist of the thesis is that strong southern trade winds are associated with wet weather in England and the neighbouring parts of the world.

This conclusion is based on the analysis of several years of anemometer records from the Island of St. Helena—and the curves plotted from these data correspond so closely with those of English rainfall that one can scarcely fail to agree with Dr. Shaw in the conclusion that the "connection can hardly be pure coincidence." The seasonal curves of the two sets of data correspond very closely, the minima of both falling in April, though the principal maximum of English rainfall, which occurs in October, lags a little behind that of the force of the trade wind which is found in September. What is even more remarkable is that the otherwise bold curve is in both cases broken by a second small rise in April. It is also undoubtedly the case that years of weak trade winds at St. Helena are associated with drought in England.

More than this, however, cannot be affirmed, as the proverbial fickleness of English weather makes the comparison disappointing when followed up in detail; so that, undoubtedly, other and disturbing factors are at work, and, as Dr. Shaw points out, "the transformation of energy in rainfall is on a vastly greater scale than that displayed by the trade winds." In any case, the observation seems promising, and emphasises the urgency of greater attention being devoted to colonial meteorology.

"Geographical Journal," February, 1906, p. 182.

CLIMATIC FEATURES OF THE PLEISTOCENE ICE AGE.

Albrecht, Peuck, Prof., bases his treatment of the subject on physio-geographical research, considering that attention has hitherto been too exclusively devoted to theoretical astronomical speculations, and to supposed alterations in the earth's axis of rotation. He shows that the snow-line "arches" across continents being higher inland than on their shores, the present level for Europe being almost 7,000 feet for littoral and 9,000 feet for inland localities. Now, in the Ice Age, what is now central Europe was near the sea, and at that time the snow-line for littoral regions was no more than 3,000 feet or less. The diminution of mean annual temperature required to produce such an effect need not, however, have been at all as great as one might imagine, "we are entitled to assume that a rather slight decrease of, say, 2° to 3° C., if connected with a diminution of the summer temperature will cause an ice age. Such a decrease will cause also changes in the amount and distribution of precipitation and the glaciations themselves will influence climatic conditions by altering the distribution of air pressure and the arrangement of the isothermic lines." The lowering of temperature was world-wide, being found as markedly in New Zealand as in Europe; and in latitudes too low for glaciation to result, a rainy period was substituted. In addition to the two great glaciations that

occurred in the Permian and Pleistocene periods respectively, there have been minor variations of mean temperature, which have merely resulted in extension and contraction of existing glaciers in temperate regions; and of corresponding epochs of moisture and of desiccation in the warmer parts of the globe. At present the glaciers are contracting and the desiccation of the interior of the continents is in progress, but probably in course of time the opposite process will be substituted, as it appears that four hundred years ago the limits of the glaciers were very much as they now are, though there has been an intervening period of extension.

Meanwhile, however, the drying up of the continents is seriously diminishing the available habitable area, as, for example, in the Kalahari Desert, where, within the last fifty years the well-known lake Ngami has disappeared, and many river-beds have dried up.

"Roussky Vrach," December 24, 1905.

PLAGUE IN MANCHURIA.

Klognitski found cases of plague in a small settlement on the Chinese Eastern Railway, in Manchuria. The population numbered 152, and 15 persons developed plague, of whom 13 (86.6 per cent.) died.

It was impossible to trace the origin of the outbreak, or to prove that the rats or mice in the neighbourhood were infected.

"Annales d'Hygiène et de Médecine Coloniale," No. 3, 1905.

PHAGEDÆNIC ULCER.

Bouffard. The ulcer extends slowly in tissues slightly bruised, but spread rapidly when there has been severe contusion. The presence of the phagedænic bacillus is the primary cause. Secondary infection of other bacteria, usually streptococci and staphylococci are always found when the ulcer is spreading rapidly. When there is no secondary infection the ulcer tends to diminish. The ulcers last from a fortnight, at least, to three months or more. The pus from the centre of the ulcer is not inoculable when inserted under the skin or into the peritoneum of dogs, cats, gazelles, or monkeys, nor could incised or contused wounds in these animals be infected. These investigations were carried out in Somaliland. After treating over 800 cases, the author finds the best results are attained with the following treatment. Ulcers of an inch diameter are swabbed with tincture of iodine, or of perchloride of iron. They are then swabbed with 1 in 200 very hot aqueous solution of cocaine. Larger ulcers are treated with 1 in 1,000 permanganate of potash, by means of a bath for the limbs, and irrigation for ulcers on the trunk, and at night the permanganate is used in fomentation. The disappearance of the phagedænic bacillus from the ulcers is coincident with the flattening of the edges, the lessening of the discharge, the pus, from yellow in colour and of an offensive odour, becomes white and odourless, and the base is red without any necrotic tissue. When this occurs 1 per cent. solution of picric acid is used for irrigating and dressing.

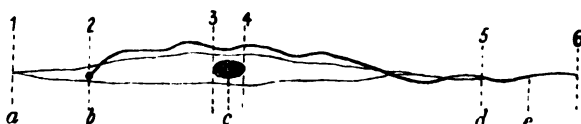
"Quarterly Journal of Tropical Veterinary Science," January, 1906.

(I.) A NEW SPECIES OF TRYPANOSOMA FOUND IN THE BLOOD OF RATS, TOGETHER WITH A NEW METRIC METHOD OF STANDARDISING THE MEASUREMENTS OF TRYPANOSOMATA.

Lingard, A., has given the name of *Trypanosoma longocaudense* to a new species of trypanosome met with in the blood of the white-bellied house rat (*Mus niveiventris*) whose habitat is the lower Himalayan ranges. The trypanosome in question was also found in one instance in *Mus decumanus*, and some other varieties of rats, apparently hybrids. The *T. longocaudense* was never found alone in the circulation, but always concurrently with some other well-recognised species of trypanosome. The chief pecu-

liarities of the new trypanosome are: (1) The inordinate length of the posterior extremity; (2) the thread-like sinuosity of the posterior extremity of the body; (3) the abrupt end of the body anteriorly; (4) the distance of the blepharoplast from the posterior extremity of the parasite. The organism can progress with either extremity forward.

Lingard's points of measurement for trypanosoma are:—



(a) Posterior extremity; (b) blepharoplast; (c) nutritive nucleus; (d) end of body protoplasm; (e) free flagellum.

(II.) OBSERVATIONS ON BILHARZIOSIS AMONG ANIMALS IN INDIA.

Montgomery, R. E., describes a new species of schistosomum under the name of *Sch. indicum*, which he found in the horse and in the donkey. He gives a full description of the male and female parasite, and the anatomical lesions they cause.

(III.) TRYPANOSOMIASIS IN THE CAMEL.

Pease, H. T., deals with this subject, under the name of Tiliarsa surra (Tiliarsa, i.e., three-year disease, is one of the many local names bestowed on surra disease), at considerable length. He considers that the surra of camels is caused by the conveyance of trypanosomes from infected to healthy camels by bites of the Tabanidae.

(IV.) THROUGH WHAT AGENCY IS THE TRYPANOSOMA EVANSI CARRIED FROM ONE SURRA SEASON TO ANOTHER?

Lingard, A., points out that equine surra appears during the rainy season (June and July) in Bombay, declines during the cold season, and reaches the minimum of prevalence during January and February, and then totally disappears for a few weeks. Equines (horses, donkeys and mules) all succumb to the spontaneous and inoculated forms of surra, but domestic bovines are capable of resisting spontaneous and inoculated trypanosomiasis (*T. evansi*), and of carrying the parasite in their blood for periods exceeding a year when derived from previous cases of spontaneous equine surra. It would seem, therefore, that by these bovines surra infectivity is carried over from one season to another.

"Archives de Médecine Navale," February, 1906.

ERADICATION OF YELLOW FEVER IN HAVANNA.

Le Méhauté, Dr. (French Navy), in the course of his medical notes on the places visited during the late cruise of the French Naval Training Ship *Duguay-Trouin* to the West Indies, gives a clear and concise history of the eradication of yellow fever in Havanna, and a brief but excellent description of the organisation of the Sanitary Services—both land and maritime—of the Island of Cuba. The results of the adequate prophylactic measures taken show that yellow fever has completely disappeared from Havanna, that small-pox no longer exists there, and that the mortality from malaria has gradually decreased from 1,907 in 1898, and 909 in 1899, to 151 in 1903; furthermore, that the general mortality of the island has also been diminished, thus showing how the sanitary conditions of a country may become ameliorated under the combined action of good hygiene and judicious prophylaxis.

MALARIAL INFECTION AND ITS TREATMENT.

Gros, H., Dr. (French Navy), here completes his able and careful practical study of malaria, which has been running through several recent numbers of these Archives. He now describes the treatment of chronic malaria and the methods of prophylaxis to be adopted, and lays down the lines for future preventive sanitary legislation against malaria.

ON THE PRESENT MALARIAL EPIDEMICS OF THE HIGH PLATEAUX OF MADAGASCAR.

"Apropos des épidémies palustres actuelles des hauts plateaux de Madagascar." By Dr. Fontoyront, Professor at the School of Medicine, Antananarivo, D.T.M., Paris.

In the last quarterly issue of the *Revue de Médecine et d'Hygiène Tropicales* for the period ending December 31st, 1905, Dr. Fontoyront states that the belief that endemic malaria was severe on the coast-line, but essentially benign on the high plateaux, was formerly a correct one, but that nowadays this is no longer the case, and that it must be confessed that the arrival of the French in Imerina has been the starting point for deadly malarial epidemics, which for several years have shown no tendency to diminish. One fact is always at once noted by an impartial observer, and that is that malaria has not increased in severity in equal proportions amongst the natives and Europeans. Whilst the mortality is stationary—and even decreasing—with the victors, it shows, on the other hand, a very marked increase amongst the vanquished enemy.

A second fact is the progress made by endemic malaria, which is yearly advancing to the eastward, describing an ever increasing and approaching curve round Antananarivo.

How can we account for this? By two factors which, united, have reacted on each other, but which, isolated, would not have produced the same results. The first is due to the large numbers of the people who had to leave their homes and emigrate to the unhealthy regions along the coast; they there acquired malaria, and on returning afterwards to their own villages transmitted—through the intermediate agency of mosquitoes—their hæmatozoa to those inhabitants who had stayed at home. The second is the dissemination of the germs, mainly due to the Malagassy custom of "Night-guards"; in every village, at night, a number of able-bodied men, in due proportion to the number of inhabitants, are obliged to pass the night outside their dwellings in order to watch over the public safety, and to prevent attack by armed marauders; these men, wearing only a cloth garment, with their beacon light, are the marked-down prey for countless swarms of mosquitoes; and as every man must take his turn at this night duty and offer himself as a resigned victim to the bites of the Anophelina, the most practical way of propagating malaria is thus ensured—almost with the facilities of a mere laboratory experiment. In those regions where the night-guard has been put down, and where the population has not moved, malaria has remained absent, although it was on the increase in the neighbourhood. Antananarivo formerly had few mosquitoes, consequently it had little ague, but when the mosquitoes became more abundant, malaria increased; this increase was the natural consequence of a large portion of land in the very heart of the city having been expropriated for the site of a future railway terminus; this land has ceased to be cultivated, became water-logged, and afforded splendid breeding places for mosquitoes, which now began to swarm; this was soon followed by a rapid rise in the number of malarial cases, with an increasing death-roll from this cause. The conclusions to be deduced are obvious, as are also the remedies, which, to economise space, are not here reproduced (J. E. N.).

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

NOTES ON DISEASES MET WITH IN SOUTH SYLHET, INDIA.

By A. B. DALGETTY, C.M., M.D., D.P.H.

Malarial Fever, Quinine and Pregnancy.—The pregnant woman is, perhaps, not more liable to malarial fever than other people, but when she does become infected the attack is apt to be more severe, and relapses are more frequent than in others, a condition which increases the strain of pregnancy and leads to anæmia and a general low state of health. If the patient is left untreated, or if she refuse treatment, as many of the natives of India do, believing that all drugs are detrimental to the unborn child, miscarriage often occurs, either from the high temperature produced by the fever, or from the severe anæmia with its cardiac trouble and consequent dropsy.

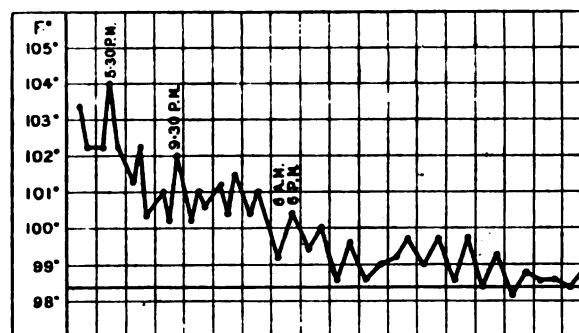
But even in cases where repeated attacks of fever have taken place during the period of pregnancy, and have gone on right up to the time of delivery, it is remarkable how little the infant seems to have suffered thereby; as a rule, it is well nourished and normal in every respect, and, fortunately, is not born infected with the *Hæmaphysa malarie*. This fact, of the arrest of the *materies morbi* of malarial fever by the placenta is a wonderful thing, and shows that the placenta must act like a fine filter, allowing fluids to pass, but keeping back all particulate matter. It is suspected that occasionally the fœtus may be attacked *in utero*, and it is sometimes stated that infants a few hours old have shown recurrent rises and falls of temperature that appeared to have a malarial origin, and since the period of incubation would be too short to allow of a post-natal infection, one is forced to conclude that the infection took place before birth; but such cases are rare, and would seem to require further observation to confirm them, although it may well be that a placenta, damaged in some way, might allow the parasite of malaria to pass from the mother to the child.

These cases of pregnancy, complicated by malarial fever, frequently cause anxiety to the medical attendant, who fears for the safety of the mother if the fever continues, and who hesitates to give quinine for fear of causing abortion. This belief that quinine should be given very sparingly to pregnant women is widespread, and some practitioners would even withhold it altogether and treat the fever with antipyretics only; but it seems to me that the danger of producing a miscarriage by giving quinine is very much exaggerated. I hold that quinine should be given in doses sufficient to control the fever, whatever the quantity required may be, and that there need be little fear of anything untoward happening. On the contrary, one sees cases where timidity in the use of quinine may be legitimately charged with the occurrence of dangerous or even fatal symptoms in the mother, or the birth of a child immature, or showing chronic brain trouble. I have given quinine during four months in doses of from 5 to 15 grains in the twenty-four hours without any untoward result, and I believe that it is only within the last ten or fourteen days of the end of pregnancy, when uterine contractions are

normally beginning to occur, and the cervix is beginning to become obliterated, that quinine may tend to stimulate these contractions; but by this time no harm will follow, even though labour be started a day or two earlier than otherwise it would have been. Pharmacology teaches that the action of a full dose of quinine upon the cardiac muscle and ganglia is to diminish the force and frequency of systole, and to lower the blood pressure, effects which, if they may be applied in the case of the uterus, would suggest a retarding rather than an accelerating influence on that organ.

Malarial Fever during the Puerperium.—The strain of parturition is apt to bring on an attack of malarial fever in a subject who has been previously infected. A febrile disturbance within the first few days after delivery always makes the medical attendant anxious, and it is a relief to know that there may be a considerable rise of temperature without serious import in a patient known to be subject to attacks of malarial fever. The following case is of some interest in this respect:—

Mrs. S., primipara, confined at 4.30 a.m., no nurse nor doctor present. Pains came on two hours previously; birth easy, child small, no laceration of

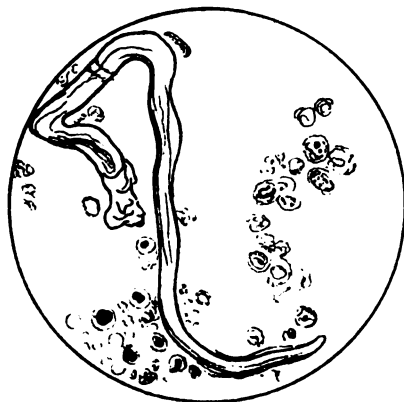


Pulse not over 80, and respiration not affected.

maternal passage. When seen at 6.30 a.m. placenta not yet delivered, but lying loose in upper part of vagina and easily removed; condition of mother and child normal, breasts contained a little milk. On the second day the temperature began to rise, and there seemed to be a little more tenderness over the uterus than usual, but the lochial discharge was natural and free from odour, and the general condition of the patient was very good. A douche of carbolic (1-100) was now given twice a day as a safeguard, although the fever was not considered to be due to sepsis, and five grains of quinine every morning. In spite of this the temperature kept up, one day reaching 104° F., and continued with irregular remissions for about a fortnight. But during all the time the patient's general condition was very good; she could eat and sleep well, her milk came, the lochial discharge remained sweet, and the involution of the uterus was not checked. I had treated her for several attacks of malarial fever during her pregnancy, and undoubtedly this was a recrudescence of that fever brought on by parturition. The slight uterine tenderness that appeared to be present may have been caused by the fever, for I have noticed as an early sign of an impend-

ing attack of malaria that joints and muscles which had been much in use shortly before, such as the adductors of the thigh in riding, or the elbow or shoulder in tennis, were the first to ache and were more tender to the touch than other parts. The character of the temperature chart is not much help in cases of malarial fever occurring in those who live in the Tropics, for it is rarely typical, being interfered with by the frequent taking of quinine and other causes.

A Case of Chyluria.—A coolie, Sakramuni, had been on the same garden for several years, and was to all appearance in usual health, when suddenly he began to pass milky-white urine. There was no difficulty in micturition, no uneasiness about bladder, no abdominal pain, and his general condition was as good as that of his class. Physical examination disclosed nothing of note; there were no enlarged glands, the spleen could not be felt, there was no abdominal tumour, and the temperature was not raised. The urine varied in milkiness from time to time, being usually clearest in the morning, but never free from it all together. It was opaque, milky-white in appearance, deposited a thick curd-like layer half the depth of the glass, with



Sketch of Filaria Embryo, $\times 300$, lying in midst of granular, fatty cells in urine.



Oval body in urine, possibly a developing filaria ovum.

a thinner, more opalescent layer above, alkaline in reaction and contained much albumin. There was no tinge of red in it. Microscopically it was seen that the urine was crowded with masses of highly refracting, round, granular cells, like lymphocytes, which varied somewhat in size and mostly cleared up on treating with ether; no red blood cells were seen. Naturally, one was on the look-out for the presence of filariæ in the urine, but I examined a good number of films before I succeeded in finding one. The specimen found was slightly damaged towards the head, but otherwise was quite distinct and unmistakable, but I could not determine to what species it belonged. It was, of course, not alive when examined, as the specimen of urine had been passed several hours previously.

The foregoing drawing shows the parasite, multiplied about 300 times, lying in the midst of the granular, fatty cells.

The elongated, oval body outside the drawing was also seen, but what it represents I do not know, unless it be a developing ovum. I have not seen a drawing of the ova of the filaria in any of the books on the subject, so I may be wrong.

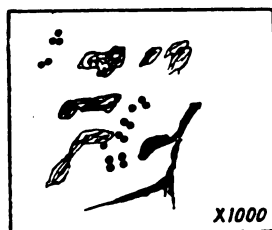
The patient went on in much the same condition, able to do his work, and showing no other signs of filarial infection for eight months. Blood films taken at this time failed to discover any filariæ in the blood either by night or day, but there was an excess of eosinophile corpuscles, as many as 11 per cent. on one occasion. At the beginning of July the urine began to be much clearer, although it still contained albumin and the same granular lymphocytes as before; and now there appeared a well-defined, lobulated swelling, occupying the right iliohypogastric region, slightly tender and giving an impression of fluctuation on deep pressure. His general health also began to deteriorate, he had fever, constipation and a foul tongue, and the blood showed a slight increase of leucocytes. An exploratory operation was suggested to the patient but his friends would not consent, so he drifted on, gradually becoming weaker, and died three weeks later of exhaustion; diarrhoea set in at the end and the urine was said to have become blood-stained. No *post-mortem* examination could be obtained. Whatever the actual pathological condition was, it would seem that the communication between the lymphatic system and the urinary channels became blocked, or nearly so, thus leading to an improvement in the condition of the urine, but being at the same time detrimental to the general condition of the patient. The lobulated tumour that developed was the result of this blocking, and probably was an enormously distended lymphatic varix, or a mass of enlarged deep iliac or sacral lymph glands. It may be mentioned that filarial disease in any form is very rare in tea-gardens in Sylhet, at any rate, the grosser manifestations, such as elephantiasis, lymph scrotum, and the like are hardly ever seen, but it may exist in masked forms, such as the condition known as circumscribed œdema of the extremities described by me in this Journal, October, 1900, and suspected to be caused by a filaria.

Cerebro-spinal Meningitis.—Hirsch, in his handbook, in 1886, says that hitherto this disease has been confined to temperate and subtropical latitudes, and that the Tropics and the Southern Hemisphere have escaped altogether. Since that time several outbreaks have taken place in different parts of the world, and notably during last year in the United States of America, but still the disease seems to remain restricted to much the same limits as Hirsch described at that date. As regards India, I have never seen any account of this form of meningitis having arisen as an epidemic, but that isolated cases do occur from time to time I think there is no doubt. At intervals during the past four or five years I have met with obscure cases which presented many of the signs of cerebro-spinal meningitis, such as muscular rigidity, retraction of the head and a deepening coma, always ending in death, but as they were always a good way off one had few chances of seeing them or of following up their history in a

satisfactory manner. The more acute symptoms of the onset and early stage of the disease are usually over before the patient is seen, and the thing that strikes one most about these cases is that they look seriously ill without evident cause; the temperature may be only slightly above normal, the pulse is slow rather than fast, there is neither cardiac nor pulmonary trouble, diarrhoea and vomiting are unusual, the absence of a wound excludes tetanus, and the symptoms are not those of sunstroke or cerebral apoplexy, yet the patient looks dangerously ill.

Not long ago I met with a less acute case which gave me a better opportunity of following up the history and the course of the disease.

Liloo, a Hindu woman, had been ill for ten days when I saw her on July 22nd, the chief complaint being severe pain in the occipito-spinal region, difficulty in walking, and general weakness. She was dull and apathetic, speech slow, pupils equal, temperature 100° F., could stand only with help, had tremors of the leg muscles, no paralysis; heart, lungs, and abdominal organs normal. Four days later the symptoms were more marked; the right arm and leg showed greater stiffening than the left, sensation in these parts was diminished, and the right knee-jerk was absent, but there was no facial paralysis and no retraction of the neck. An attempt was made to get a drop of spinal fluid, but without success at this time. Blood films did not show leucocytosis. On August 5th further developments had taken place: the patient was now semi-comatose, the head was drawn backwards and slightly towards the right shoulder, the eyes were turned upwards, outwards, and to the right, there was tightness of the hamstring muscles, but Kernig's sign was not well marked, pulse slow and very weak, respiration shallow, there was no rise of temperature, and I did not notice a skin eruption. There was tenderness along the spine, as shown by the patient shrinking when the skin was being disinfected for lumbar puncture. On this occasion I succeeded in getting a few drops of cerebro-spinal fluid. Under the microscope this showed a few flakes of epithelium, and in two specimens several micrococci were discovered; these lay together either in groups of two or groups of four amidst some particle of broken-down cells; they were rounded or oval in shape, and when stained with methylene blue had a clear space round them, but no definite capsule. I had no Gram's stain available to try its effect.



The patient gradually sank, and died on August 9th, four weeks from the beginning of the illness. A *post-mortem* examination was not made.

I have short notes of four other cases, of which two were boys, one a middle-aged man and one a young

man; all were fatal, and all had the cardinal signs of this disease—sudden onset, marked depression, pains in spine, retraction of head, stiffness of muscles, ending in coma and death within a few days. In one only was the temperature high, it reached 106° F. shortly before the end.

One would like to follow up such cases as these more closely, but the lack of opportunity of seeing more of one's patients, owing often to the long distances to be traversed and the trying circumstances surrounding work in the Tropics, will be readily understood by all who have practised in hot countries.

Morbus Maculosus Neonatorum.—The following seems to be a case of this rather uncommon disease. An infant, three days after birth, developed bleeding from the mouth and anus. When I saw it on the fourth day the hæmorrhage from the mouth had stopped, but dark red blood was still oozing from the anus. The confinement had been uncomplicated, and the child had not received any injury; it looked healthy and well nourished, and showed no signs of syphilitic disease, and there was no jaundice. There was no history of lues in the parents, and there were several more children in the family, all healthy looking. Liquid extract of ergot, in 3 minim doses thrice daily, was given, and the bleeding had ceased within ten days and did not recur.

Diet and Health.—It is a common cry of vegetarians and other food faddists that flesh food is not a necessary part of the dietary of man, and they point to the case of whole races who are said to subsist on a rice diet alone, and are yet able to preserve perfect health. Like many other general statements on subjects made by those who do not have a first hand knowledge of the facts, that statement is only partly true, and it may be of interest to record my experience among many thousands of tea-garden coolies, extending over a period of nine years, with reference to this point.

I shall take anæmia, which is a general result of many different deleterious causes, as the test of health. Anæmia is a very common trouble amongst tea-garden coolies in many parts of Assam, and sometimes becomes so rife that it seriously interferes with the work of a garden. Women, of course, suffer more than men, probably on account of the stress of pregnancy aggravating the condition, and it is no unusual thing to see a woman well advanced in pregnancy unable to stand or to lie down, and reclining in a sitting posture, with feet and legs swollen, the abdomen half full of fluid, the hands œdematous, the face so swollen that she can hardly see, the conjunctivæ and tongue of marble whiteness, bruits all over the chest, and fluid at the base of the lungs, a condition, in short, that if not soon relieved must speedily prove fatal. Nature usually sends relief by causing abortion; gradually the dropsy becomes absorbed, and in a few weeks the patient has returned to her normal state—a state, however, which is always one of relative anæmia.

That is, of course, an extreme instance, but it is by no means an uncommon one, and there are all degrees of severity leading up to that; while the men suffer almost as frequently, if a little less severely. The causes of this anæmia are various, but I am not at present dealing with them. Now, a short

acquaintance with tea-garden labourers teaches one that not all races of coolies suffer equally, and here it may be noted that Hindoo coolies differ from one another in race and language as much as a Highlander from a Cornishman, or a Welshman from a man of Norfolk; one sees that the dark-skinned coolie, such as the Santhal, who spends all he earns on food and drink, and eats fish, flesh and fowl, almost never suffers from anæmia; while the fairer-skinned coolie from the North-West Provinces, who hoards up every pice he can get, lives on food almost wholly of a vegetable kind and shuns the flesh of animals like a plague, falls an easy prey to the disease whenever his small reserve of energy is exhausted by a trifling illness.

The conditions in which these two distinct types live are absolutely identical, and both are imported from a distance to work on the tea-gardens, so that both have to become acclimatised, so to speak; the only difference lies in the nature of their food. The strong, black coolie feeds well on a mixed diet and is hardly ever a prey to anæmia, while the other, who lives on a vegetable regimen, is nearly always below par, facts that would seem to support the proposition that man best maintains his strength on a mixed diet. I am quite well aware that these two types have probably had a very different origin, that the Santals are, perhaps, an aboriginal race, and that the coolies from the North-West have very likely sprung from a mixed Aryan stock; but for many thousands of years both have lived and worked under the same Indian sun, and it seems to me that the great difference between them lies in the nature of their diet, and that this is sufficient to explain the presence and the absence of anæmia in the two races.

Medicine and Witchcraft.—One meets with many instances of the belief in witchcraft amongst the Hindoos, and the methods employed to counteract the supposed influence of evil spirits are very interesting, although it is often difficult to get at the bottom of the matter, because the people themselves are half ashamed of their superstition, and are afraid to say much about it for fear of being ridiculed. The following incident is interesting, for more than one reason. One night, during a sharp thunderstorm, the lightning had been attracted by a papaya tree, about 12 feet high, which was growing near a native hut, and striking the ground entered the house and ploughed up a zigzag furrow across the floor of a room in which two men were sleeping. The lightning had passed within two feet of the wooden bed on which they lay and most of its force had been spent in the ground, but a portion of it had glanced aside towards the feet of the two men and passed up their bodies, having been attracted, possibly, by some empty oil tins that were standing near the head of the bed.

One of the men escaped with a little singeing of the hair on his legs and chest, but the other did not fare so well. The lightning had singed him, like the other, but had then struck the right side of his head, entered the ear and stunned him. When I saw him he was still in a dazed condition but quite conscious, was able to answer questions slowly, and complained of pain in the right ear; there was a slight oozing of

blood-stained fluid from the meatus, and on throwing in the light it was found that the drum was torn across. There were no gross signs of brain injury apparent then or afterwards, but he continued in a depressed state for many weeks, though he was able to go about and seemed otherwise well. Now comes the witchcraft part of it, which probably explains a good deal of the melancholia from which he suffered. Although he and his friends were quite well aware that the injury was done by the lightning, yet in their own minds they connected that physical phenomenon with a demoniacal origin. They believed that an evil spirit, or "bhoot" as they call it, had taken up its abode within him, and they recollected that a short time before he had passed a burying ground on his way home one night, and the inference was easy that some ill-disposed spirit, lurking about, had found him an easy prey, and had taken advantage of his being asleep to enter his body in that forcible fashion. So, as it was desirable to expel this unwelcome guest as speedily as possible, and seeing that the doctor sahib did not believe in such supernatural visitants and could only treat natural effects by natural remedies, the patient's friends took council together how best to attain that end.

Accordingly, they hired the services of a band, composed of drums, cymbals, and other more or less noisy instruments, formed a circle round the patient, and then let loose their witch-compelling din. At the same time one of their holy men stuffed ghee, or clarified butter, into his ears, for everything that comes from the cow is pure and sacred, and held the victim's nose over a smoking lamp of incense in order to make his quarters too hot for the demon. The "bhoot," however, appeared to be in no hurry to quit, for this performance went on for many nights, and at the end of it the patient was no better than at the beginning. Finally, I heard that he went a good distance off to be treated by someone renowned as an exorciser of evil spirits, and that after a time he returned with a lighter pocket, if not with a lighter head.

The Evil Eye.—There would be many a sudden death if a look would kill, but, fortunately, it is not so, although the belief in being "overlooked" by the "evil eye" to one's harm is not dead, and is still met in places where one would hardly expect to find it. Among Eastern peoples it still strongly exists, and the following instances will show some of the means adopted by the Hindoos to avert this evil influence. When a person receives a cut on the leg or arm, or suffers from an ulcer, one of the first things he does is to tie round the limb a cord of twisted human hair, to which, very often, a small shell is attached. The purpose of this is to prevent the sore from spreading over the limb and over the body, thereby causing death, an event which he thinks would happen if some ill-disposed person were to "overlook" him with the evil eye whilst he is suffering from his wound. It is not easy to see what disenchanting virtue can lie hidden in a snail shell or a band of twisted hair, unless the comparatively long-lasting nature of these has something to do with it.

Here is another custom practised by some, the meaning of which is explained differently by different

people. The mothers apply a black dye or pigment round the eyelids of their infants after the child is old enough to be taken out. The black substance is said to be a natural earth dug from some of the hills, but I believe any black pigment will serve the purpose. The explanation of this practice varies; some say that it is only done for looks' sake, some that it is to protect the delicate young eyes from the strong light and the glare of the dry ground, while others admit that it is done to annul the intentions of any evil-minded person who might be envious of her neighbour's pretty child and overlook it for its harm. The first of these reasons is hardly sufficient, for their dark skin throws the white of the eye into sufficient relief without the artificial aid required for that purpose by the belles of the West. The second explanation, that it protects the eyes from the glare, has something to be said for it, for I have noticed in white dogs when one eye lies in the midst of a black or brown patch, and the other is surrounded altogether by a white ground, that the former eye is strong, and free from inflammation, while the latter is very often the seat of a chronic conjunctivitis. The greater amount of pigment in the skin of the dark patch seems to diminish the irritating effects of the light and glare. However, as the black eyes of the natives rarely suffer from this cause, the third explanation would seem, perhaps, to be the right one, namely, that it protects the child against the "evil eye."

Another example may be given. When riding about one often sees near a busti, or native croft, as it may be called, a clay cooking-pot with a few white lines and circles painted over its bottom, hanging mouth downwards high up on the end of a bamboo pole; this too, I believe, is intended as a protection against the "evil eye." The design on the upturned pot, which seems always to be an old one with a black bottom, is two white lines crossing one another, with a small white circle in each of the four triangles thus formed, a rough imitation, perhaps, of a human face with four eyes, and intended to attract the glance of the "evil eye," thereby diverting its malign influence from the house and its inmates: a spell, doubtless, not less potent than ours of hanging up a horse-shoe by the door-lintel.

A possible explanation of the origin of this practice has occurred to me. When the rice harvest has been gathered in the straw is built up in round stacks which have a pole running up the centre to keep them upright. Since these stacks are never thatched the heavy rains would get in at the top around the pole, and rot the straw, and to prevent this a small clay cooking-pot is put over the top of the pole, so that the rain is diverted all round. At the end of the year, when the straw has been used up, the bare pole is left standing with its hat at the top like a very tall mushroom with a very small head, and it thus forms a rather striking object, and in course of time it would probably occur to someone looking about for a prominent point of advantage whereon to inscribe his anti-charm that here was the very thing, so that by and bye the cymbal would be set up altogether independent of its original purpose.

The Scapegoat.—The old Hebrew custom of laying the sins of the people upon a goat and turning

it adrift into the desert still exists to some extent among the Hindoos, who resort to this device in order to rid their family of illness. Since a goat is rather too expensive for a poor man's purse he utilises a chicken instead. The "bhoot" which is supposed to be the cause of the person's illness is exorcised into the hapless chicken, a red mark is then put on its forehead, and it is taken well out into the jungle and allowed to escape. The disease is expected to go with it, and its former owner feels no qualms of conscience to think that some innocent mortal happening across the "scapegoat" may become a new victim. But the danger therefrom cannot be very great, for I know a sahib who once stumbled over one of these escaped chickens, and, taking pity on it, put it in his pocket and brought it home, unwitting of the risk he was running, and he is yet alive and well. Another ingenious if equally unkind device to rid one's self of an illness and foist it on another is to set down a pair of wooden shoes belonging to the patient hidden from sight at a point where two paths meet. Strings are fixed to the shoes and to wooden supports at the sides of the road, so that the first person coming along steps into the trap, the threads break, and the patient is cured of his disease at the expense of the newcomer. It is chiefly during epidemics and in long illnesses that resist medical treatment that belief in demoniacal possession gains the upper hand of the people, and compels them to resort to charms and incantations; at other times they are quite ready to seek the help and carry out the methods of modern medical science.

THE ANATOMY OF THE BITING FLIES OF THE GENERA *STOMOXYS* AND *GLOSSINA*.

By Lieut.-Colonel G. M. GILES, I.M.S. (Rtd.).

(Continued from p. 156.)

OF the pseudo-tracheæ of the "tongue" of the commoner flies I have as yet discovered no trace, but behind the leaf-shaped blades are two other rows of five strongly chitinated teeth of nearly as large size as those first described. Of these the one next to them has teeth with ends like that of a cheese-cutter, while the innermost has a point curiously serrated on one side, and a number of short, stout, intensely black-blue bristles may be also added, but a complete description of this wonderful structure would exceed all reasonable limits. To conclude the description of the labium, it will thus be seen that, though somewhat stiffened by its median sclerite, it is quite without any basal support, as the median sclerite tapers away to nothing at the base, and the external integument, though deceptively dense to external appearance, is really soft and flexible, and specially creased to admit of its being shortened in the same way as an accordion.

If we now turn to the upper lip or labrum, we find a structure formed exactly on the model of a hypodermic needle, and in every way as admirably adapted for piercing as the labium is obviously impossible for such a function. It differs from the familiar surgical

instrument only in the detail that the tube is incomplete, a narrow slit running along its entire ventral surface to the point, where it expands, so as to make the organ end in a point, like that of a pen. It forms, however, fully three-fourths of a complete tube, and the remaining fourth, as will be seen by reference to fig. 16, is completed by the dorsal surface of the hypopharynx. It must be remembered that all members of the fly family are provided with a similar apparatus, the difference being merely one of relative length.

Though in reality continuous with the delicate membrane that at first forms the upper wall of the tubular buccal cavity, the dense chitin of which it is composed ends abruptly at a line a little before the base of the labium, and its two corners articulate with a pair of sclerites, named by Lowne the apodemes of the labrum, which in their turn articulate with two cornua projecting forwards from the chitinous skeleton of the cephalo-pharynx, called the fulcrum by the same writer. These apodemes are rod-like structures, which closely resemble the human clavicle in form; and the fulcrum is a hollow frame of chitin of rather curious form. Behind it may be taken as continuous

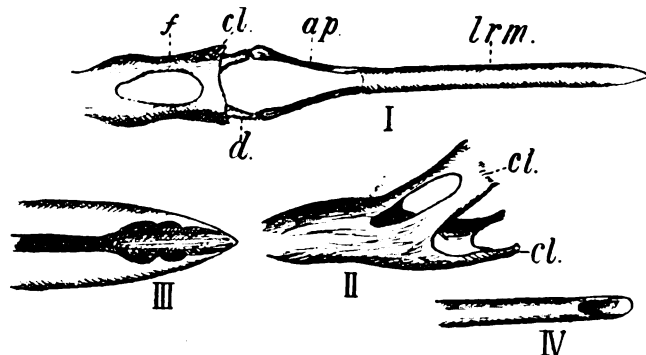


FIG. 19.—I. Semi-diagram showing the chitinous skeleton of the labrum, or upper lip: *ap*, apodeme of the labrum; *cl*, chitinous plate uniting epistome with the clypeus; *d*, distal cornua of fulcrum; *f*, fulcrum; *lrm*, labrum. II. The fulcrum drawn in perspective. III. Point of labrum; and IV., end of hypopharynx at the same higher magnification.

with the pharynx, but in front the sides are open, while the dorsal and ventral aspects are prolonged as two plates, the upper one of which turns upwards to fuse with the clypeus, and so affords an immovable connection with the chitinous exoskeleton for the front of the head. This plate is pierced by a large foramen which gives passage to the nerves and tracheæ of the trunk, and also for an air chamber continuous in front with those of the labium and behind with those of the head and of the body generally. The lower plate, on the other hand, is shaped much like the half of a butcher's tray, the handles of the tray being represented by the two cornua which again articulate with the proximal ends of the apodemes. The labrum is therefore connected with the skeleton of the head by the intervention of two joints, movable only in flexion and extension, and each capable of being moved or fixed by appropriate muscles. The point of the labrum is bevelled, and the edges of the

resulting pen-like structure are each armed with two keen but not very trenchant teeth of such a form as to equally facilitate rapid withdrawal and insertion. When in function the slit in the ventral aspect of the tube is closed by the apposition of another structure, the hypopharynx. This springs from the floor of the mouth, level with the base of the labrum, and is a prolongation of the salivary duct. It consists of a delicate but fairly stiff tube, the dorsal side of which is produced laterally to form two alæ, which curve backwards in such a way as to form a fairly deep groove on its dorsal side. Seen in section (fig. 16, *h*), it is seen that the tube is comparatively small in proportion to the thickness of the walls, but it must be endowed with considerable elasticity, as was shown by a curious accidental experiment.

I had placed an entire insect in water (from spirit), with the view of dissecting the proboscis, and had spread apart its three components, when, under my eyes, the hypopharynx began to swell and lengthen, till it protruded a long way beyond the labella, and at last it snapped in the middle, after which the pieces rapidly resumed their original size. The orifice of its tube, I conclude, was in some way obstructed, and osmosis had done the rest. Sections of the entire proboscis show that the alæ fit into a curious slot in the edges of the labrum and so convert it into a complete tube through which the blood is drawn into the œsophagus.

The arrangement recalls in many ways that whereby the outer case of a cycle tyre secures itself to the rim of the wheel, which in this case is represented by the hypopharynx, but is designed to make the resulting tube withstand not positive, but negative pressure.

As already indicated, I do not believe that in *Stomoxys* the labium has any share in piercing the skin, but that it acts as a protective sheath to the more delicate lancet, and supplies the muscular force whereby the latter is driven into the skin. This, the writer believes, is effected in the following manner: By means of the various hooks and blades of the labella it attaches itself to the skin of the animal to be operated on, and then by a contraction of its powerful longitudinal muscles forcibly shortens itself, so that the labrum is made to protrude and, guided by the labella, is thrust into the skin. With a little trouble it is possible to imitate this in a fresh fly to some extent by handling the labium with the needles so as to make it lengthen and shorten. As there is no bending out of the way of the labium, such as occurs in the mosquito, it appears to the observer exactly as if the labium itself had entered the skin; the illusion being something on the principle of the stage dagger.

It must be remembered that the parts are none too large, and that any one attempting to watch the process cannot put his head too near, for fear of disturbing the fly, added to which, when animals are bitten, the fur further interferes with the possibility of seeing exactly how the operation is performed. To watch the process to any purpose would require the use of a powerful hand lens, and this is, of course, out of the question.

From the comparative point of view, the anatomy of the proboscis of *Glossina* closely resembles that of *Stomoxys*, but differs remarkably in many details. At

their bases, the resemblance between the two probosces is fairly complete, and the foregoing description of the chitinous skeleton of the mouth-parts might here stand almost as well for those of *Glossina*, but here the resemblance ends. A very cursory examination shows that the visible parts of the probosces

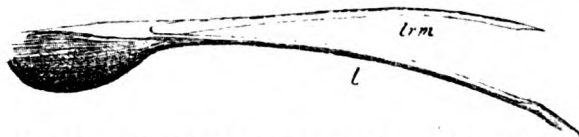


FIG. 20.—Proboscis of *Glossina palpalis*. l, Labium; lrm, labrum.

(labium) consist of two distinct parts, a large basal bulb, as thick or thicker than the base of the labium of *Stomoxys*, and a long, extremely slender rod ending in a blunt end, slightly bent backwards, so as to form an instrument exactly like a French urethral bougie. This slender part is densely chitinised and hence very stiff, but the bulb has a thin flexible integument like that of the other species. Moreover, the pair of large muscles which largely fill up the bulb, instead of remaining muscular nearly to the end of the proboscis, terminate in two delicate tendons which run through the entire slender portion to be inserted into the base of the labella.

The form of the hypopharynx and its relations with the labrum are entirely different from any other fly I have examined, and conclusively show the correctness of the general opinion that the entire slender part of the proboscis is introduced into the wound in the skin.

In *Stomoxys* and the other flies as yet examined by me, the apposition of the labrum and hypopharynx forms a tube through which the food of the insect is conducted to the oesophagus, but between these two parts in *Glossina* there is no tube, because the apposed parts are moulded to exactly fit each other.



FIG. 21.—Transverse section of the proboscis of *Glossina palpalis* at almost mid-length. h, Hypopharynx; l, labium; lrm, labrum; t, tendons of the contractor muscle of the bulb enclosed in tubular chitinous canals in the substance of the labium. Note.—The ventral side of this figure is uppermost.

As will be seen from the figure, the hypopharynx is a solid rod of semilunar section, with a rib running down its flat ventral face within which is the salivary canal. The convex dorsal side fits closely against the labrum, which is wrapped round it, the edges of the latter extending beyond its own, and inverted so as to form quite five-sixths of a complete tube. In somewhat similar manner the labium is wrapped round the labrum, the edges of the former overlapping those of

the latter for quite a quarter of the circumference of the tube formed by their apposition. The slot on the dorsal surface of the labium therefore forms rather more than half a circle, and opposite the slit between the edges of the labrum runs a minor groove of the same width. Both walls of the labium are very thick and densely chitinised, especially in the middle line, and it is further strengthened by infoldings of chitin which support the sheaths of the long tendons of the contractors of the bulb.

The thickness of the slender part of the proboscis is less than 0.04 mm., and its length 1.4 mm.; that of the bulb 0.57 mm., and that of the part of the labium that projects beyond the labrum in the position of rest 0.17 mm.

An examination of the above drawing (fig. 20), however, shows at once that the labium, with its blunt, bougie-like end, is quite unsuited for piercing the skin, while the labrum is eminently adapted for doing so. A shortening of the length of the bulb by even a third of its length, through the action of the powerful contractor muscles, would suffice to bring the cutting point of the labrum beyond the blunt end of the labium; and assuming the latter to be fixed to the skin by means of the jagged teeth of the labella, would enable the former to make a wound into which the labium could be introduced like a probe. Once introduced, a sawing alternate action of protrusion and retraction of the labrum would enable the entire apparatus to penetrate to its full depth with comparative rapidity, as the mouth of the wound would be at the same time enlarged by the saw-like edges with which, it will be noticed, the sides of the labium are provided. The labella are smaller and certainly much more rigid than in *Stomoxys*. Judging from spirit specimens, one would say that they were ankylosed to the trunk of the labium, but probably in fresh specimens they can be separated to a moderate extent. Hausen's description and figure of the labella in Mr. Austen's monograph of the tsetse-flies appears quite accurate, and as he suggests that some part at least of their armature is brought into action by the protrusion of the elastic membrane carrying them, it seems probable that he also regards the labella as capable of but little separation.

In the position of rest the united ends of the labella form a perfectly smooth, probe-like instrument, as the somewhat complicated armature of teeth and blades, with which they are provided, are entirely hidden between them. Even when protruded, however, it is difficult to imagine any method by which they could effect a wound large enough for the organ on which they are carried to follow them.

We will now proceed to some description of the organs contained within the head.

In the middle line, just above the roots of the antennæ, will be seen a minute foramen. This is the opening of a rather extensive cavity which extends backwards under the vertex nearly half-way to the occiput, and is nearly as wide as it is long. It has also a considerable depth, and from its floor two large median processes project into its interior, besides which there are sundry median and lateral diverticula. The whole cavity has a dense chitinous wall, and is closely beset with short conical hairs. The presence

of this cavity gives rise to appearances somewhat difficult to interpret in section, unless one is aware of its existence. This cavity is the inverted frontal sac, and in the pupa is everted to form a large bulla, by means of which the operculum of the pupa case is burst open to admit of the escape of the imago, but it does not appear to serve any function in the latter, so that its significance is entirely developmental.

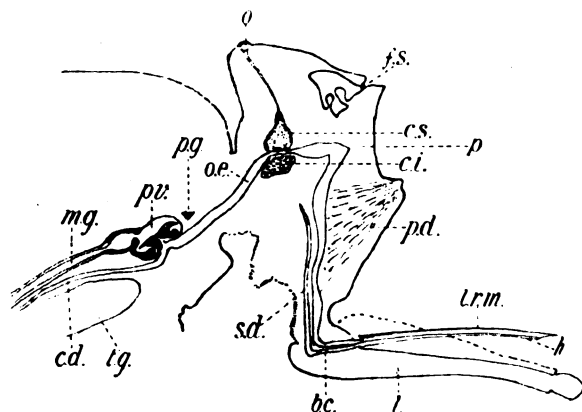


FIG. 22.—Vertical section of head of *Stomoxys*, semi-diagrammatic. *bc*, Buccal cavity; *cd*, duct of crop; *ci*, sub-oesophageal cerebral commissure; *cs*, supra-oesophageal cerebral commissure; *h*, hypopharynx; *l*, labium; *lrm*, labrum; *mg*, midgut; *o*, ocellus and its nerve; *oe*, oesophagus; *p*, pharynx; *pd*, dilatator muscle of pharynx; *pg*, proventricular ganglion; *pv*, proventriculus; *sd*, common salivary duct; *tg*, thoracic ganglion.

The buccal cavity is contained in the base of the proboscis, its anterior boundary, where the hypopharynx springs from the floor of the lower wall, being opposite the thickest part of the bulb. It is quite a narrow cavity, and is strengthened by transverse chitinous fibres, and it may be said to end and the pharynx to commence at the point where the soft flexible root of the proboscis begins. From this point the pharynx runs nearly vertically upwards in the axis of the head to a point opposite the middle of the large second antennal joint. Here it becomes the oesophagus and bends sharply backwards, in the longitudinal axis of the insect, to pierce the cerebral commissure, narrowing to an extreme tenuity, and then runs backwards and downwards through the neck to the under-surface of the proventriculus.

The pharynx is the true aspiratory organ by means of which the blood of the victim is sucked. It is of considerable size, being a quarter of a millimetre across at its widest part; but in the position of rest is a mere slit, the anterior and posterior surfaces being in contact. The slit is not, however, straight, but nearly semilunar, with the convexity backwards.

The concave ventral surface is formed of a dense plate of chitin, and is practically immovable, though it is steadied by a pair of lateral muscular bands. The anterior or dorsal surface, on the other hand, is soft and flexible, and inserted into it on either side are the powerful dilatator muscles which spring from the interior of the ridge which bounds the recess below of the hollow in which the antennæ lie.

When these muscles contract they must neces-

sarily draw forward the flexible anterior wall of the pharynx; and as, from its density, the posterior wall cannot follow, it must needs convert the closed slit into an open cavity of oval section. In some respects the arrangement resembles that of the *Culicidæ*, but in them there is a localised elastic bulb which can be, like the pharynx of *Stomoxys*, actively dilated; but in that genus there can be no elastic contractility, and the return to the slit form of lumen must be through the agency of the pneumatic pressure of the great air sinuses with which the organ is surrounded.

In the above figure of a median sagittal section, the dilatator of the pharynx should, strictly speaking, not be represented, as there is a considerable interval in the middle line between the two planes of muscle, but to save an additional figure their direction is indicated by broken lines. The transverse section here

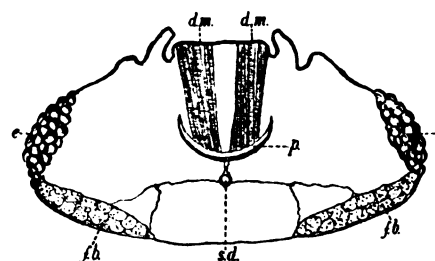


FIG. 23.—Horizontal section of head of *Stomoxys*. *dm*, Dilatator muscles of pharynx; *e*, lower edge of eyes; *fb*, fat body; *p*, cavity of pharynx; *sd*, salivary duct.

depicted will, however, serve sufficiently to indicate the true position of these muscles.

When piercing the transverse cerebral commissure, the oesophagus contracts to a lumen of no more than 0.015 mm.; and behind it the tube again dilates, but is compressed instead of depressed. The common salivary duct, from its origin at the base of the hypopharynx, follows the course of the buccal cavity and pharynx, at a little distance from it ventrally, and ends by dividing into the right and left ducts at a point about level with the apices of the antennæ. This is a good deal further back than as indicated by Hansen, and still more in contrast with the bifurcation in *Glossina* as stated by Prof. Minchin. Hansen (fig. 21, pl. 8, of Austen's monograph) also figures a large salivary reservoir.

It may be gathered from the context of his memorandum that he relied on his interpretation of the parts as seen in optical section through the integuments, and this probably accounts for the illusion, for the writer has no hesitation in stating that no such dilatation exists, as the duct has been followed in an unbroken series of sections from the hypopharynx to its bifurcation at the point indicated, and it nowhere exceeds 0.02 mm. in diameter. As far as can be made out, the spiral fibre which strengthens the duct in many diptera is wanting here. Shortly after entering the thorax the ducts cease to be chitinous and become glandular. In fig. 22 the size of the duct is intentionally exaggerated so as to make its position clearer.

The salivary ducts, after division, run together in

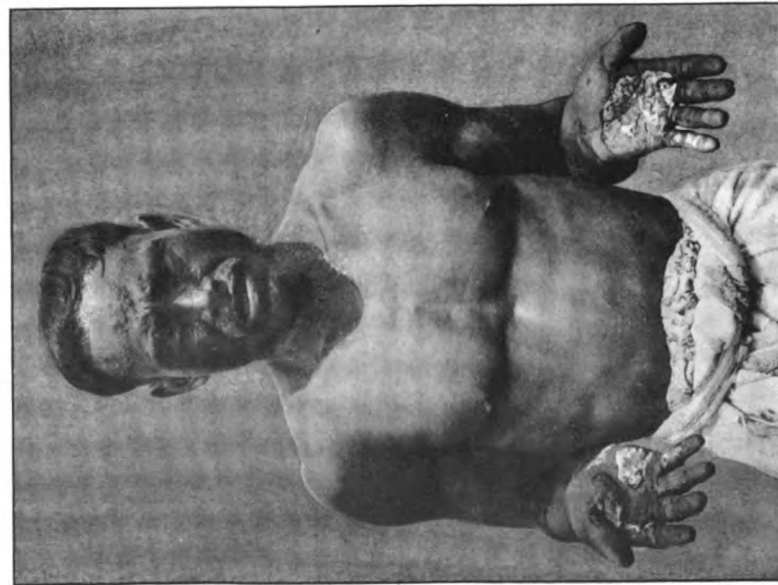


FIG. 2.—Che Musa. Showing effect of late puru on the palms. The skin is otherwise normal. There is no affection of the throat or tongue.

To illustrate article by T. D. GIMLETTE, M.D., "The Puru of the Malay Peninsula."



FIG. 3.—Puru mata kerbau. From a photograph taken by J. R. Dubois, Esq., at the village of Kuala Takal in the interior of Kelantan.

contact, close under the soft ventral integument of the head to the neck, and so do not follow the stomodeal canal, which is, however, accompanied in its passage through the cerebral commissure by a pair of tracheae of about the same calibre as the salivary ducts, and by two nerve fibres.

Speaking generally, the anatomy of the head of *Glossina* appears to coincide closely with that of *Stomoxys*, but Prof. Minchin notes that the salivary ducts bifurcate further forwards. The most striking point about the brain of these and other flies is its large size, which must be relatively considerably larger than that of most of the lower vertebrates. There do not appear to be any details of special interest in the brain of either *Stomoxys* or *Glossina*, and as a large number of papers are easily available on the dipterous brain, any further description is quite superfluous. A very excellent account will be found in Lowne's work on the Blow-fly vol. ii., p. 453, and a shorter statement in Prof. Minchin's paper on *Glossina* in the *Proc. Roy. Soc.*, vol. B., 76, p. 532. Before quitting the head it may be well, however, to add a few words on the histology of the principal organs.

(To be continued.)

THE PURU OF THE MALAY PENINSULA.

By T. D. GIMLETTE, M.D.¹

(Continued from page 153.)

THE VARIETIES AND COMPLICATIONS OF PURU.

MALAYS distinguish the varieties of many of their diseases by a number of clinical names. For example, small-pox, which is common among them, has been given—under the name of “*penyakit ketumbohan*”—no less than eleven different descriptive names, according to the appearance of the pustules. Again, the average intelligent Malay will recognise at least seven different varieties of ringworm. Puru is divided in the same way into several varieties, the chief of which are: “*Puru siput*” or “*puru kechar*” (“*siput*” and “*kechar*,” a shell); “*puru mata kerbau*” or “*puru kerbau*” (“*mata*,” an eye; “*kerbau*,” a buffalo); “*puru sekam*” or “*puru dedak*” (chaff or bran); “*puru kretas*” (paper); “*puru kochi*” (Cochin China sore); “*puru tapak anjing*” (“*tapak*,” a footprint; “*anjing*,” a dog); “*puru pitis*” (a small coin); also “*puru parang*” (“*parang*,” a chopper) and “*puru kenam*.” Puru of the foot is generally known as “*bubol*,” but it is frequently referred to in Kelantan as “*puru duriyan*.” “*Bubol*” has been somewhat fancifully divided into “*bubol sarang*” (“*sarang*,” a nest); “*bubol malai*” (aigrette); “*bubol susoh ayam*” (“*susoh*,” a spur; “*ayam*,” a chicken), and “*bubol bubok*” (“*bubok*,” a wood maggot).

Of these Malay varieties, “*puru siput*” is characterised by its rupial-shaped sores, and is perhaps the most common. It is considered to be the most benign form. It is not painful, and the sores heal easily. An example of “*puru siput*” is shown in fig. 1.

¹ We have to apologise to Dr. Gimlette, inasmuch as we were in error announcing his valuable communication as a Craggs Research prize essay.—Ed. J. T. M.

“*Puru mata kerbau*” is common. The sores are very large, but heal readily. Kelantan Malays call this the real puru. It may be combined with “*puru pitis*.”

“*Puru sekan*” is especially irritable with regard to itching.

“*Puru kretas*” is distinguished from other forms of puru by the general superficial character of the eruption. It is only skin deep, gyratory, very painful, and difficult to cure. It is the worst kind known and may cause death. It may be combined with “*puru mata kerbau*.”

“*Puru tapak anjing*” is another bad kind of puru. It is very painful, and leaves large, though insignificant, scars, either similar to a dog's footprint or very irregular in shape. The sores are supposed to occur on the body, placed in the way a dog leaves marks after walking on the sands—here some and there some, and none in the middle.

Puru kochi has been mentioned under etiology. It is referred to in an old Malay dictionary as the venereal disease [16]. “*Puru kochi*” is said to be chronic. It is not considered fatal, although no native medicine will cure it. It is also called “*puru glang besi*” (glang, lit. a bracelet or anklet; besi, iron).

Puru kenam: in Kelantan “*kenam*” is said to occur when small children get lumps (“*kenam*”) all over their body. It appears as circular red spots, and it is interesting to note that it is sometimes known as “*puru Burma*.”

Puru parang is said to complicate other sores, and to be recognised by its deep ulceration. It occurs on the foot, and is said to attack old people.

There are various other unimportant so-called varieties.

Intercurrent diseases are generally the cause of death. A first attack of puru in old age is always serious. Young children may succumb, although rarely, to asthenia. Cellular abscesses may form. Scars are indefinite, but it is exceptional to find villagers who have not had puru early in life, and who cannot point in later life to some dark scar left by the disease. The old scar of “*puru ibu*” is well remembered by Malays, as are vaccination marks by Europeans. It resembles in appearance the scar of scalds or burns of the third or perhaps fourth degree, except that it is dark in colour. Scars are sometimes definitely depressed, and when on the face may cause contractions of the mouth known in Malay as “*sipit mulut*” (“*sipit*,” puckered; “*mulut*,” mouth). Permanent deformity of the limbs and ankylosis of joints may also be the result of puru. This disfigurement is very common, and is known as “*birat*” in Malay.

THE DIAGNOSIS OF PURU.

Doubtless if the nature of puru were not well understood many cases of it might be classified as syphilis, because at first sight there seem to be many points of resemblance. Both rank among affections the study of which is mainly clinical; both are constitutional diseases with a period of incubation, efflorescence and decline; each is conveyed by direct inoculation, and followed in a slowly running course by the occurrence of remainders, and perhaps sequels with a tendency towards spontaneous cure. Puru is so well known to

Malays, however, that they are unlikely to confound it with any other disease. They know that syphilis can be passed on from father or mother to their children, but hold that puru is always acquired.

The diagnosis is chiefly based on the combination of the characteristic eruption with itching, on the peculiar insensibility of the tubercles, on the general uniformity of their aspect, and on the limitation of



FIG. 1.—Mehpih—Case 1—showing the puru ibu.

the constitutional disturbance. There is only one disease—called “supia” in Kelantanese Malay, and “sang kai she toy” in Chinese—which might be mistaken for puru. This is confined to children, and occurs about the head, neck, and scalp. It appears to be similar to impetigo contagiosa, and, except for the clinical appearance of the honey-coloured scabs, to have but little real resemblance to puru. Puru does not attack the foetus. Even when it occurs in infants

before the age of eight months, it hardly ever causes an increasing cachexia with terminal diarrhoea. The peculiar hue, physiognomy and “snuffles” of syphilitic infants are wanting. The puru ibu, again, differs essentially from the primary sore of syphilis, in being generally made up of a collection of multiple tubercles which is not prone to ulcerate, but likely to last throughout the disease. This is in marked contrast to the single sloughing sore of primary syphilis as it is generally seen in Malaya. I have never seen inflammatory sore throat (“sakit kailan” or “kekail” in Malay) in puru. Polymorphism and symmetry never strike the every-day observer in any of the skin lesions of any of the varieties of puru as they may do in syphilis. Itching is the rule and alopecia the exception. Bone lesions are, I think, rare. It is difficult, indeed, to know to which stage of syphilis the Malay puru may be compared to in detail. Although, as in Case 3, a child can infect its mother with puru if unprotected, people who have had puru can contract syphilis, and others (as in Case 4) who have had syphilis can contract puru.

European practitioners must, I think, be familiar with examples of syphilis acquired by Englishmen returning home from the Malay peninsula. Puru, however, is probably unknown to them. In the one case the disease, if acquired from a Malay, is probably due to some chance infection. In the other, a European, unless converted to Mohammedanism, could never, I think, live in sufficiently close contact with Malays so as to acquire the disease for a certainty.

CLINICAL CASES OF PURU.

CASE 1. *Puru in a Malay Child.*—Mehpih, a girl, aged about 9, Kelantan villager, born at Dusun Nyor in the interior of Kelantan.

Father and mother dead; no brothers or sisters. Patient was first seen at Dusun Nyor (lit. the garden of coco-nuts) on June 13th, 1905; she is said to have been ill with puru mata kerbau for more than six months. The sores are almost confined to the legs and the back and inner side of the thighs. For the most part they are soft, yellowish-white, and moist. The secretion from all the moist sores (about five or six in number) was found to be alkaline. Some of them were inclined to bleed on being scraped. The child is anæmic, but otherwise the general health appears to be unimpaired. She has lost the sight of the right eye owing to an accident. There is no apparent enlargement of the spleen on palpation, although malaria is very common among Kelantan children.

Puru is very prevalent in this village. Out of about forty inhabitants, fourteen or fifteen children are ill with puru mata kerbau. Examination of blood smears taken from some of them, as well as from the patient (in the forenoon), proved to be negative.

Several smear preparations made from the sores on June 13th, and again on the 21st, were stained by the Romanowsky and other methods, but nothing distinctive was found by me under the microscope beyond a number of round granular cells which stained readily with basic dyes. There were no large cells and micrococcus-like bodies which have recently been described by Surgeon-Captain James [10], Dr. Homer

Wright [17], and others, as occurring in tropical ulcer or Delhi sore. This child was treated by the local application of zinc and mercurial ointments mixed together, and when last seen on July 24th, 1905, the sores, with the exception of the puru ibu, had nearly all healed.

CASE 2. *Puru in a Chinese.*—Hap Hoy, a mining coolie, native place Hong Kong, married, no children, was admitted into the Duff Development Company's Native Hospital at Kuala Lebir, Kelantan, on April 1st, 1905.

Family History.—Father died of some chest complaint about 50; mother alive and well; no brothers; one sister in good health. Has never seen any cases like his own among friends or relatives in China.

Previous History.—Emigrated from China eleven years ago, and, with the exception of malarial fever, has always been in good health.

Stayed in Singapore for five years, was in Pahang for two years, and at Tomoh for four years, when he got ill and went from there to Kelantan. He never had syphilis nor gonorrhœa; has not had sexual connection for more than twenty months; has never had a sore on the penis before. Is accustomed to take a little samshu (Chinese spirit), also chandu (opium prepared for the pipe).

States that he knows two fellow-countrymen at Tomoh who have the same disease all over their bodies, and that it is very common among the Malay children of that state. Did not live in the same house with the other Chinamen. Has eaten "budu" (a Malay condiment made of decomposing fish) when there was no better sauce to be procured.

Present Illness.—About six months ago was cutting firewood in the jungle and scratched the foot at the right ankle. A week previous had felt unwell and feverish. The ankle was painful; the scratch itched a little and presently became sore. Four or five sores then developed, and in about forty days they coalesced and reached their present horseshoe shape and size, which is (April 5th, 1905) 6.35 cm. by from 2.54 cm. to 0.63 cm. Later on the foot was painful on walking any distance. A month afterwards again felt feverish, and the eruption came out on the forehead and scalp. A sore came next on the left side of the prepuce; it itched and he scratched it. In two months' time sores had formed on the right side of the prepuce. Up till now he had continued at work, but then the sores attacked the nose and eyelids. The nasal sores spread out gradually at the nostrils until they reached their present size, namely, on April 5th, 1905, nearly 10.16 cm. by 1.9 cm. Had then to stop work as a mining coolie on account of pain in the bones and in the joints, and decided to come to Kuala Lebir. The sores are now (April 5th, 1905) drying up. No fresh ones have appeared for about a month. The last to appear were on the back.

On Examination.—The eruption is known in Malay as puru, and it has the characteristics of the disease as shown in fig. 4, which was taken on April 3rd and 5th, 1905. There is no apparent enlargement of liver or spleen. There is sympathetic femoral bubo in the right groin, but it is unlikely to suppurate. No other glandular enlargements. The foot sore is suppu-

rating under a thick scab. The discharge is acid to litmus paper, but that from the sores on the penis and forehead is alkaline. Two tubercles were removed from the back under cocaine, as well as one from the prepuce. Prior to examination, these nodules were placed for twenty-four hours in 30 per cent. alcohol (in filtered water), then for the same time in 70 and 90 per cent., and finally in absolute alcohol. The result of the microscopical examination is given under the heading of pathology.

The sores were dressed with Scott's dressing and a mixture of iodide of potash, 5 grains, three times a day, administered by the mouth. The sore on the ankle was dressed with chlorinated soda lotion.

By the end of the month a great improvement in the general health had taken place. The pains in the limbs and joints had entirely ceased. On May 25th another tubercle was removed from the hairy part of the chin, and carbolic acid, pure, was applied to the cut surface, because it seemed as if puru sores were forming at the site of the former incisions. They all healed naturally, however, in the end. In June, the iodide was increased in dose to 10 grains and 5 minims of liq. arsenicalis were added to the mixture. The patient improved daily, but only up to a certain point. He was next given mercury internally, the liq. hydrarg. perchloridi, in half-drachm doses for two weeks, but as he appeared to be still losing ground under this treatment it was discontinued, especially as some of the old eruption (which had apparently been cured) began to recur. Various local applications were then tried, including the application of tincture of iodine, ichthyol vasogen, thymol ointment, and white precipitate ointment, but without much success. He was finally treated with zinc and mercury ointment alone, and appeared to derive most benefit from it.

(To be continued.)

"Archiv. f. Protistenkunde," T. vii., pp. 1-74, with 162 figures in text.

ON ALTERNATION OF GENERATIONS AND CHANGE OF HOST IN *TRYPANOPLASMA BORELLI* (LAVERAN AND MENIL).

Keyoselitz, Gustav. This is a long and very complete memoir, covering much the same ground as has been described by Brumpt, though the author differs from the latter in many points, notably in regarding the species found in a variety of freshwater fishes as all referable to the above species, the intermediate host being the leech, *Pisciola geometra*. Both the fish and the leeches often succumb to the infection, the most striking symptom in the fish being anemia, while the colour of the leeches alter and their clitellar region becomes swollen.

He never once succeeded in infecting one fish from another even of the same species, and believes that the supposed successes of other authors were really cases of relapse of an old natural infection, and, though he was equally unsuccessful in his attempts to infect fish through the agency of the leeches, he describes in great detail a cycle of evolution which closely follows that described by Schaudinn in the case of *Trypanosoma noctua*, so that under natural conditions it is probable that this leech acts as a true intermediate host, and forms the agent of infection. For fuller abstracts of this paper vide F. Mensil in the *Bulletin de L'Institut Pasteur*, April 15th, 1906.

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THE

Journal of Tropical Medicine

JUNE 1, 1906.

PROFESSOR ELIE METCHNIKOFF.

(The Harben Lectures.)

THE Royal Institute of Public Health has from time to time brought distinguished men from several parts of Europe to London to deliver the Harben Lectures. The course for this year has been given by Professor Metchnikoff, of the Pasteur Institute, Paris, and it is scarcely necessary to add that a great scientific treat has been afforded us. The subjects chosen for the three lectures were, on May 25th, "The Hygiene of the Tissues of the Organism," on May 28th, "The Hygiene of the Intestinal Tract," and on May 30th, "Syphilis."

In the lecture on "The Hygiene of the Tissues," Professor Metchnikoff expounded his views in a condensed form, and defended the service the phagocytes render in procuring immunity, a service which is being largely claimed for a soluble substance circulating in the blood and met with in other body liquids—the opsonin of Wright.

This advocacy of a humoral action is based on the belief that microbes in the blood must be impregnated with opsonin before the phagocytes can attack them and destroy them. The rôle the phagocyte plays in the destruction of pathogenic microbes, if this belief be

true, is only of a passive character, and dependent on the preliminary action of the opsonin. Metchnikoff is not inclined to acknowledge the superior potency of opsonin in comparison with the phagocyte in procuring immunity. He states that there can be no doubt that, under artificial conditions, and outside the body when the phagocytes are weakened they do not show their functional activity to such advantage as inside the body; but left to themselves in a liquid deprived of all opsonic substances, the phagocytes surround the microbes, only instead of doing this in a quarter of an hour, it takes them perhaps an hour or two to accomplish the act.

That the living body remains apparently healthy in spite of its containing pathogenic microbes would appear now to be a fact. A man may be the host of diphtheria bacilli, cholera vibriones, the *Bacillus typhosus*, and other bacteria, without necessarily developing the corresponding diseases. It is even possible to introduce tetanus spores into an animal so peculiarly sensitive to tetanus as the guinea-pig without the animal acquiring the disease. When, however, the guinea-pig so infected is placed under unfavourable conditions, as by exposing it to a very high temperature, the resistance of the animal is overcome and the disease asserts itself.

Human beings may serve as bacilli carriers without they themselves being the subject of the disease which the bacilli may give rise to in others; this fact is of superlative interest and importance in the study of epidemiology, and is one calculated to divert our attention to other sources of infection than to those we are accustomed to view with suspicion, such as milk, water, and other articles of food and drink.

Metchnikoff sums up his conclusions on this subject by stating that all observations on immunity against infective agents points to the belief that this phenomenon is the result of phagocytic action, or, in other words, that immunity is a function of the cells. Of substances which hinder phagocytic action, opium and alcohol are perhaps the chief, but he also inculcates quinine as a poison to the white blood cells. Increased resistance towards pathogenic microbes is a department of prophylaxis which promises to play an important part. Issaëff, some ten years ago, showed that increased resistance could be procured in guinea-pigs by injecting these animals with such liquids as normal saline solution, urine, and serum. R. Petit has recently employed heated horse serum in his gravest operations. In a case of abdominal section on a woman, on whom he operated for multiple fibromata of the uterus, complicated by inflammation of both adnexa and by suppurative pelvic peritonitis, Petit poured into the abdominal cavity before suturing the abdomen about 30 grammes of heated horse serum with successful results. Several other surgeons have followed Petit's example, and in cases of abdominal and pleural operations the use of heated horse serum has been eminently satisfactory. Miculiez, by introducing subcutaneously injections of a solution of nucleinic acid twelve hours before operation, showed that an increase in the number of white blood corpuscles in the blood occurred, reaching, in one instance, to as many as 24,000 per cubic millimetre.

Whether it be heated horse serum, a nucleinic acid, or other substances that are employed, Metchnikoff considers that they all act in one way. The influence they exert is not brought about by an increase in the sensitising substances nor by a production of opsonins, but by enhancing the phagocytic reaction.

By the establishment of the thesis that the phagocytes are our arms of defence against the infective germs which beset our bodies, Metchnikoff contends that the first step forward in the hygiene of the tissues has been made, and that a secure foundation stone has been laid on which to build our knowledge and experience.

MALARIA IN CUBA AND PANAMA.

W. C. GORGAS, M.D., Chief Sanitary Officer, Canal Zone, Panama, stated at the annual meeting of the American Society of Tropical Medicine on March 24th, 1906, that while the percentage of fatalities is not nearly so great as from some other tropical diseases, the amount of incapacity caused by malaria is very much greater than that due to all other diseases combined. He drew attention to the deleterious effect of unchecked malaria upon soldiers during a campaign.

The effect of the eradication of mosquitoes, upon the number of cases of malaria was very noticeable in Havana. For many years the average number of deaths from malaria amounted in Havana to 350; in 1901, the first year of the anti-mosquito campaign, the number of deaths from malaria amounted to 151 only; in 1902 there were 77 deaths from the disease; in 1903 about 50, and during subsequent years it averaged about 40. In the hospital at Ancon, Panama, in the six months ended March, 1906, Colonel Gorgas had personally treated 1,055 cases of malaria with only five deaths. The *Æstivo-autumnal* variety predominated, and quinine was the invariable mode of treatment. Of twenty cases of hæmoglobinuric fever in the eight months ended March, 1906, only three died.

THE PLAGUE.

PREVALENCE OF THE DISEASE.

		Cases.	Deaths.
<i>India.</i> —Week ended	March 10th	10,665	9,058
	„ 17th	13,325	10,722
	„ 24th	17,240	15,464
	„ 31st	13,996	11,823
	April 7th	23,055	19,727
	„ 14th	20,478	17,673
	„ 21st	19,674	17,679
	„ 28th	17,885	15,633
	May 5th	15,892	13,295
<i>Hong Kong.</i> —Week ended	Mar. 31st	27	25
	„ April 7th	24	22
	„ 14th	21	23
	„ 21st	24	27
	„ 28th	58	52
	„ May 5th	61	58
	„ 12th	96	89
	„ 19th	90	83
	„ 26th	116	116

Persia.—Plague continues in epidemic form in Eastern Persia (May 29th).

Arabia.—Plague has been declared at Jiddah (May 30th).

Egypt.—During the week ended April 15th, 35 cases of plague were recorded in Egypt, chiefly in the Minieh and Kenh provinces.

Reviews.

THE NATURE AND TREATMENT OF CANCER: SOME METHODS OF HYPODERMIC MEDICATION IN THE TREATMENT OF INOPERABLE CANCER. By John A. Shaw-Mackenzie, M.D.Lond. Third edition, revised and enlarged. London: Baillière, Tindall and Cox, Henrietta Street, Covent Garden, 1906. Pp. 99. Price, 2s. 6d. net.

Every practitioner will welcome this concise account of the treatment of cancer by modern methods. The principal remedies dealt with are Chian turpentine, soap and ox-gall, and trypsin. The results given are, to say to the least of them, encouraging.

THE ANIMAL PARASITES OF MAN. A Handbook for Students and Medical Men. By Dr. Max Braun. Third, enlarged and improved edition, with 294 illustrations in the text. Translated from the German by Pauline Falcke. Brought up to date by Louis W. Sambon, M.D., Naples, and Fred V. Theobald, M.A. London: John Bale, Sons and Danielsson, Ltd., Great Titchfield Street, Oxford Street, W., 1906. Price, 21s. net.

Parasitology is assuming so important and prevailing a position in medicine that for several years to come it will be assigned the foremost place amongst the several accessory departments of scientific research and study. It is essential, therefore, that an authoritative text-book should be in the hands of medical men.

Dr. Max Braun's well-known work on the "Animal Parasites of Man" has, it is to be feared, been capable of being read by only a very few practitioners owing to lack of knowledge of German, and we are thankful to the translator and to the publishers, who, at a great sacrifice of time and of money, have now given us an English edition of this important work.

Braun's work is the best book on the subject, and it has been translated by Miss Falcke, on whom we, in this country, have come to largely rely for accurate translation of German medical and scientific books into English.

The chapter on parasites in general is a liberal education in itself, and were the student of general medicine to advance no further than this chapter in his reading he would be placed in a position to grasp the importance of the subject, and to lay a foundation on which to base a scientific knowledge, so as to enable

him to enquire more carefully into any branch of the subject he may be interested in.

The protozoal, the primitive, parasites, are in many ways, perhaps, the most interesting; chiefly on the ground that they are of all parasites the most closely studied at the present time. Amongst the protozoa we find the rhizopoda, of which the various amœba are best known; the flagellata, represented by trichomonas, cercomonas and trypanosoma; the sporozoa, of which the gregarinida and the large group coccidiida are of high importance, and yet better known the *Plasmodium malariae* of Laveran. The flat-worms (platyhelminthes) and the thread-worms (nematodes) are more familiar to the general reader, and the student of tropical medicine will take special interest in the filaria and the ankylostoma. Of the various groups of arthropoda, the arachnoidea, from the fact that the several species of argas and of ornithodoros are included amongst them, are of special interest at the moment. A separate chapter is devoted to mosquitoes and the various flies, including the tsetse-flies.

The illustrations are clearly represented and their accuracy incontestable. The study of parasitology is yet in its infancy, but before its literature becomes too voluminous it would be well for present-day students to master the contents of this book so that the subject may be readily understood and followed. We are indebted to Dr. Sambon for his careful revision of the chapters on protozoa, cestodes, and nematodes; and to Mr. Theobald for his exposition on the trematodes, arthropoda and several other sections of the work. We congratulate the publishers upon the general appearance of the book and for supplying us with a clearly printed text.

The thanks of the profession are due to the publishers, the translator, and to Dr. Sambon and Mr. Theobald, for placing within our reach an authoritative text-book on an important subject.

Drugs and Remedies.

HELMITOL, a powerful urinary antiseptic, is a preparation of the Bayer Company, Limited, 19, St. Dunstan's Hill, London, E.C. In the treatment of cystitis, fetid urine, and in troubles associated with enlarged prostate, it is excellent. In gonorrhœa helmitol internally, combined with local injections of protargol, is efficient.

SOLUROL (thyminic acid) in 3 or 4 grain doses daily after meals is a new remedy for gout, introduced by Allen and Hanbury, Limited, 37, Lombard Street, London, E.C.

Notes and News.

AN "At Home" at the Royal Albert Dock Branch of the Seamen's Hospital Society, on Saturday, May 19th, was attended by about 200 executive officers of all the London and many provincial hospitals. The

occasion was the completion by Mr. P. Michelli, Secretary of the Seamen's Hospital Society, of his year of office as President of the Hospital Officers' Association, and amongst those present were Sir Francis Lovell, Sir Frederick Young, Capt. Tunnard, Mr. Keith D. Young, the Society's architect; Mr. W. R. Pite, architect to the new King's College Hospital; Dr. Harford, of Livingstone College; Dr. C. C. Choyce, Medical Superintendent of the Dreadnought Hospital; Capt. Worlidge; Mr. Walter Alvey, Honorary Secretary Hospital Officers' Association; and Mr. Charles T. Walrond, consulting engineer St. George's Hospital and the Children's Hospital, Great Ormond Street, and several others. The Hospital and the London School of Tropical Medicine in connection therewith were open to inspection, details of the building being given by Mr. Keith D. Young. A lantern demonstration was given in the theatre of the School and a demonstration of microscopic specimens of the parasites of malaria, sleeping sickness, &c., was given by Dr. Stanton in the laboratories. Speeches were delivered by Sir Frederick Young and others, and opportunities were afforded for visiting vessels of the P. and O. and Ocean Lines.

SPREAD OF LEPROSY BY INSECTS.—Dr. W. T. Goodhue, Superintendent of the Molokai Leper Settlement, states that he has found the *Bacillus lepre* in the female mosquito—*Culex pungens*—and in the bed-bug—*Cimex lectularius*. The fact that the leprosy bacillus has been found in insects is not, we believe, new; what we are anxious to know is whether these insects play a part as intermediate hosts, and what cycle of evolution, if any, takes place in their economy.

W. C. GORGAS, Chief Sanitary Officer, Isthmian Canal Commission, Panama Canal Zone, in a report dated Ancon, April 16th, 1906, states: The health conditions continue excellent. No quarantinable disease occurred in the Zone during March. No case of small-pox has occurred within the last year. The last case of plague occurred seven months ago, and the last case of yellow fever over three months ago. Among the 25,000 employees we had 78 deaths, 10 among the whites and 68 among the negroes. Of the 10 whites 5 were from the United States. Of these 5 only 3 died from disease, 1 from pneumonia, and 2 from dysentery. The two principal causes of death among the employees were malaria, 22, and pneumonia, 17. The disease that caused the next highest death-rate was dysentery, 8, and the next after that accidental traumatism, 4. The March in which the French had the largest number of employees on the Isthmus was the March of 1885, when they had 16,755 men on their rolls. During that month they had 9 deaths from yellow fever in Ancon Hospital. How many deaths occurred outside of that hospital they had no means of finding out. During March of 1906, with our force of 25,000 men, which is the largest we have had, we had not a single case of yellow fever on the whole isthmus. But the best measure of the health of a body of men is the average number daily

sick. We had in our hospitals from our 25,000 employees, on each day for the month of March, an average of 491 sick men, which would give us a rate of 19.65 per 1,000, an exceedingly good showing.

COLONIAL NURSES DECORATED.—Mrs. Duncan Urquhart and Miss Margaret Graham have been decorated by the Order of St. John of Jerusalem in England. Their names were brought to the notice of Mr. Chamberlain, then Colonial Secretary, by the Principal Medical Officer of Southern Nigeria, for the excellent work they did during the recent expeditions and for the devotion and self-sacrifice shown by them on all occasions. Mrs. Urquhart and Miss Graham have been admitted honorary nursing sisters and are entitled to wear the Maltese Cross of white enamel of the Order of St. John.

MOSQUITOES.—*Culex sollicitans* will breed in no other place than salt water. To get rid of this mosquito it is necessary to drain the salt-water swamp lands along the coast where this mosquito prevails.

TRACHOMA IN MONTREAL.—Amongst 1,000 emigrants from Europe, one half of which were composed of Russian Jews and Syrians, 150 cases of trachoma were found.

Personal Notes.

COLONIAL MEDICAL SERVICE.

Dr. Derwent Waldron, Senior Medical Officer, Gold Coast Colony, has arrived in England on leave of absence.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Transvaal Medical Journal," March, 1906.

Maynard, G. D. "Some Observations on the Protozoal Diseases of the Blood, with Special Reference to the *Piroplasma Bigeminum*."

Of forty-five cows inoculated with the blood from a heifer which had recovered from an experimental attack of red-water disease, 4.4 per cent. died. Of forty-three cows in the same herd which were allowed to contract the disease naturally, 11.7 per cent. died. The cows showed a reaction (first) on the tenth day, and also a reaction (second) on the twenty-fifth day after experimental reaction. In regard to the appearance of *Piroplasma bigeminum* in the red corpuscles, Maynard is of opinion that when two parasites appear in a cell the explanation is to be frequently found, not in the division of an originally single parasite, but in a double infection by two young parasites. The two parasites may be gametes about to conjugate to form a zygote, so that a sexual cycle, as well as an asexual cycle, might be assumed to occur in the one host. A prolonged observation, however, failed to demonstrate any union of pairs, but on the other hand, the mother parasite extruded from its substance a small mass of protoplasm which grew in size, and finally became free from the parasite and the

red corpuscle in which the parent was contained. In addition to the extrusion of these daughter cells the parent parasite also undergoes several divisions within the red corpuscles before the daughter cells are extruded. The frequent appearance of two chromatin masses in the pear-shaped parasite seems to suggest a nuclear division prior to conjugation. The possibility, therefore, of a sexual as well as an asexual cycle in piroplasma infection would seem a feasible interpretation of the phenomena observed, and of the clinical symptoms and behaviour of this disease generally. From the fact that conjugation in certain forms of the tertian malaria parasite has been stated to occur, Maynard suggests that the peculiarities of malignant malaria seem to demand some such interpretation not accounted for by the theories explaining the symptoms of simple malaria.

"Journal of the American Medical Association," March 24, 1906.

Vedder, E. B. "An Examination of the Stools of 100 Healthy Individuals, with Special Reference to the Presence of *Entamoeba Coli*."

The *Amœba coli* has been found by Schaudinn, Craig and others in from 20 to 65 per cent. of the stools of healthy individuals in different parts of Europe. Vedder, from observations made in the Philippines, recently found that of Americans in the Philippines 50 per cent., and 70 per cent. of the natives of the Philippines harboured the parasite. As these were healthy persons the observation helps to confirm the belief that the *Amœba coli* is not a pathogenic factor in the production of dysentery.

Vedder classifies the characteristics of the dysenteric and of the normal amœbæ as follows:—

<i>Entamoeba Dysenteriae.</i>	<i>Entamoeba Coli.</i>
SIZE.	
25-30 microns. (Not a distinguishing feature.)	10-20 microns.
SHAPE.	
Usually some other shape.	Spherical when resting.
COLOUR.	
Greenish.	Opaque greyish.
PROTOPLASM.	
Ectoplasm and entoplasm easily distinguished.	Ectoplasm and entoplasm distinguished with difficulty.
Ectoplasm very refractive.	Ectoplasm not refractive.
Ectoplasm finely granular.	Ectoplasm homogeneous.
Entoplasm coarsely granular.	Entoplasm finely granular.
PSEUDOPODIA.	
Large and easily distinguished.	Entirely ectoplasm. Hard to distinguish.
Certain ectoplasm and entoplasm.	
VACUOLES.	
Many vacuoles.	Vacuole absent usually. Never more than one.
NUCLEUS.	
Often absent. When present structure of nucleus hidden except in stained specimens. Nuclear membrane not well defined.	Almost invariable, with well-defined nuclear membrane and other structure.
Changes position markedly.	In moving organism retains its relative position.
RED CORPUSCLES INGESTED.	
Many.	None observed.
MOTILITY.	
Great progressive motility.	Often absent, and when present, of limited extent and short duration.

"Il Polliclinico," Rome, May, 1906.

THE CEREBRO-SPINAL FLUID IN CERTAIN CASES OF PERNICIOUS FORMS OF MALARIA.

"Il liquido cefalo-rachidiano in alcuni casi di pernicioso malarico." By Dr. Nicola Pende.

According to Dr. Pende the study of the cerebro-spinal fluid in malarial infection has been entirely overlooked, which is the more remarkable as the examination of this

liquid is now undertaken in nearly all morbid processes complicated by severe nervous symptoms, from which list malarial infection cannot well be excluded.

Two indications are now specially sought for in the study of the cerebro-spinal fluid. The one is essentially a clinical one, or an aid to diagnosis; the other is essentially a scientific one, relating to the physio-pathology of the cerebro-spinal fluid, in the hope of finding therein a key to the mechanism of the symptoms due to the neural axis. With this double object in view, Dr. Pende undertook some researches on the cerebro-spinal fluid in malarial cases, restricting himself for the present to the more severe forms of the disease, *i.e.*, the pernicious forms. The severity and diffusion of the æstivo-autumnal attacks which were recently noted in the Roman hospitals supplied him with many cases for observation; nevertheless, in many instances, he experienced some considerable difficulty in obtaining the fluid, either because the pernicious condition of the patient was a contraindication for the lumbar puncture, or because the quantity so obtained was insufficient, or was not perfectly clear owing to the admixture of blood. For these reasons the present remarks apply only to five cases of pernicious attacks of malaria, specially selected for their nervous symptoms.

Each examination of the cerebro-spinal fluid included not only the cito-diagnostic formula, but also, as far as possible, the principal physico-chemical properties. A bacteriological examination was unnecessary owing to our certain knowledge of the etiology of malaria; in each instance the following were specially sought for:—

- (1) The state of compression of the fluid.
- (2) Appearance and chromo-diagnosis.
- (3) Density.
- (4) Crioscopic point.
- (5) Hæmolytic power.
- (6) Amount of albuminoids.
- (7) Fibrinous reticulum.
- (8) Amount of chlorides.
- (9) Sediment, especially with regard to the cito-diagnostic formula.

The fluid extracted never exceeded 20 cc. The cases occurred in women of all ages, who were received between June and December, 1905, into the Hospital of St. John Lateran. A series of control experiments, conducted on the identical lines, were carried out in perfectly normal cases who had been admitted to the surgical division of the same hospital.

For the study of the compression of the cerebro-spinal fluid a special form of manometer was used. The crioscopic point was determined by Beckmann's apparatus; Bard's process was employed for studying the hæmolytic power; the amount of chlorides was obtained by the Wolhard-Salkowski method; lastly, for the cito-diagnostic examination, Nikiforoff's reagent was employed for fixing the slides, which were then coloured with thionin or with hæmatoxylin and eosin.

The results obtained from the examination of the cerebro-spinal fluid of healthy women was as follows:—

The pressure varied enormously; the density was 1007 to 1010; the congesting point = 0.65; albumen, constantly present; percentage of chlorides, 0.8 per cent.

Some clinical notes on the several cases of pernicious attacks now follow, but want of space prevents their insertion here.

* * * * *

As a result of these observations, Dr. Pende states that the cerebro-spinal fluid may present, in certain cases of pernicious malarial attacks, alterations both in its physico-chemical properties and in its cito-diagnostic formula.

One constant feature was noted in all the cases, *viz.*, a more or less diminution of osmotic tension. It is important to note that the hypotonic condition of the cerebro-spinal fluid has, until now, been considered almost pathognomonic of meningitis, whether tubercular or cerebro-spinal, but as

has been seen, this same hypotone may be found also in the severe nervous forms of malarial infection.

In two of the cases lymphocytosis was superadded. Thus malaria in its severe forms has to be added to the somewhat lengthy list of morbid processes, accompanied by lymphocytosis of the cerebro-spinal fluid.

The percentage of chlorides in the majority of cases was diminished.

As regards the chromo-diagnosis, in one case the liquid was yellowish, and in another it showed a bright green fluorescence.

Dr. Pende considers the serious disturbances which the cerebral circulation undergoes, owing to the heaping-up of the parasite-infected corpuscles in the capillaries, as sufficient to explain the origin of the above-mentioned modifications. The alterations of the endothelium of the capillaries and the obstruction of many of these by parasitiferous thrombi may be the cause of some of the blood elements passing from the capillaries themselves into the perivascular lymphatic spaces, and from these into the arachnoid cavity, which elements may produce the diminution of the molecular concentration of the cerebro-spinal fluid, or the presence of blood corpuscles, or lymphocytosis, or yet again, the presence of pigment, and perhaps also of toxic substances already existing in the circulating blood.

As to the question whether the alterations of the fluid can enter into the pathogenic mechanism of the nervous symptoms of pernicious fevers, little as yet can be said definitely, for the physio-pathology of the cerebro-spinal fluid has not yet furnished us with sufficient experimental or clinical data to solve this problem.

J.E.N.

"Centralb. f. Bakter.," 1, Origin., T. xl., p. 290.

RESEARCHES ON BACILLARY DYSENTERY.

Ludke, H. The author has studied the agglutinins and precipitins of the bacillus of dysentery. Their behaviour, when treated with strongly agglutinating serums of the Shiga-Kruse and Flexner bacilli respectively, leads the author to believe that the latter is a variety of dysenteric bacillus which appears only in certain epidemics.

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Original Communications.

SUBHEPATIC ABSCESS.

By JAMES CANTLIE, M.B., F.R.C.S.

THE classification of abscesses of the liver, which for the past ten years I have adopted as a means of clinical differentiation, would appear to hold good as experience extends. The terms suprahepatic, intra-hepatic, and sub- (or infra) hepatic abscesses have more than a mere anatomical or descriptive convenience and significance, more even than a clinical import, for investigation has served to establish a pathological basis of some reliability.

The examples of subhepatic abscess which have come under my notice have been few, five in all, four of which occurred in patients of my own. By a subhepatic abscess I do not merely mean that pus from the liver has simply pushed its way downwards to the under-surface of the liver, and there opened into a neighbouring organ or into the peritoneal cavity, but that the abscess originated on the under-surface of the liver, between the peritoneum and the liver substance, and involved the neighbouring liver tissue secondarily.

In three of the five cases of subhepatic abscess, the pus drawn off at the operation was proved to be sterile. This is in no way characteristic or exceptional, for in 32 out of 47 suprahepatic abscesses I have operated upon the pus has also been found to be sterile. On the other hand, the abscesses originating intrahepatically have almost, without exception, been proved to contain bacteria in the pus drawn off when the abscess is first opened. I do not refer to the amœba, which we meet with in the wall of every collection of liver pus, as it is in the wall of most abscesses connected with the abdomen, and is therefore without specific pathological significance.

A subhepatic abscess may occur in persons who dwell in the Tropics or who have never been out of Britain. Of the cases in question the habitat of the patients was as follows:—

No. 1, an American sailing ship captain, who, whilst his ship was lying in Hong Kong harbour, developed a subhepatic abscess. No. 2, a lady who had resided some years in Alexandria. No. 3 a man who had never left Britain. No. 4, a sailor who belonged to the Royal Navy. No. 5, a man who had never left Britain. Subhepatic abscess has no pathological relationship with dysentery or any form of intestinal flux, although in two of the cases the patients confessed to diarrhœa but not to dysentery.

In four of the cases the collection of pus was on the under-surface of the right half of the liver, to the right of the gall-bladder; in the fifth case the under-surface of the left half was involved.

History of a Typical Case of Subhepatic Abscess.—The patient becomes conscious of a discomfort in the neighbourhood of the right rib cartilages, intermittent at first but in time becoming more persistent; the discomfort is most marked during the day, and lying down affords relief. As a rule the pain is referred to the neighbourhood of the gall-bladder, and at first, and indeed later, the signs and symptoms appear to indicate gall-stones, or an inflammatory affection of the gall-bladder. Occasional attacks of fever, passing off

in sweats, occur, and if the patient has been in a sub-tropical or tropical country, malaria may be (and has been) suspected to be the cause. The indefinite nature of the ailment leads to delay in diagnosis and to the necessary treatment; for a tender spot with some fulness beneath the right rib cartilages may be ascribed to kidney, liver, gall-bladder, pancreas, or bowel. The mobility of the swelling points to the possibility of a movable kidney; the general disturbance with pain in the region of the liver suggests hepatitis or perihepatitis or hepatic abscess; the situation and shape of the swelling, the local pain, and the fever accompanying the condition, would seem to definitely point to a cholecystitis; but malaria, malignant disease of the hepatic flexure of the colon, pancreatic cyst and hydatid, have each and all been suggested as explanations of the indefinite clinical signs and symptoms which obtain when a collection of sub-hepatic pus occurs.

The further general signs and symptoms it is needless to recount, a collection of pus anywhere in the upper part of the abdomen will give rise to occasional vomiting, furred tongue, loss of appetite, a markedly fluctuating temperature, rigors, sweatings, disturbance of the bowels now loose now constipated, and so on. There is no one sign or symptom, when a swelling occurs in the epigastrium or right hypochondrium, that can determine the diagnosis, nor any group of signs or symptoms which may not bear in the present state of our methods of clinical diagnosis, a plethora of interpretation.

Given, however, a distinctly painful spot on the under-surface of the liver associated with constitutional disturbance and pyrexia, and, it may be, a blood examination suggesting pus, an exploratory incision ought to be made without hesitation.

CASE 1.—Captain of a sailing ship, aged 42, plying between New York and Hong Kong, developed a sub-hepatic abscess. The captain lived on board ship, which had been lying in Hong Kong harbour from November to March before the abscess was detected. The patient was operated upon with the idea that he was suffering from cholecystitis. When the abdomen was opened a sausage-shaped swelling was found lying parallel to and $1\frac{1}{2}$ inches to the right of the gall-bladder. The wall of the abscess cavity was stitched to the abdominal wall and the abscess cavity opened and drained. The abscess extended almost the whole breadth of the liver in an antero-posterior direction. The patient returned to his ship in twelve days, sailed on the thirteenth day, and only withdrew the drainage tube some six weeks later whilst on the voyage. He made a perfect recovery.

CASE 2.—A lady, aged 31, married, one child, had had several attacks of "fever" and diarrhœa in Egypt. When seen in London there was a movable swelling between the right hypochondrium and the right lumbar regions; the spleen was enlarged, the liver dulness increased downwards, febrile attacks with irregular temperature and malarial parasites in the blood. I diagnosed the case as one of malaria with movable kidney. Subsequently, when the swelling was exposed, it proved to be a subhepatic abscess, identical in situation and in character with Case 1. The patient recovered.

CASE 3.—A man, aged 38, resident in London for ten years, who had at one time served in the army in Malta, but have since never left the British Isles. The clinical evidence all pointed to the presence of pus in the gall-bladder, but when the abdomen was opened, an abscess reaching from the anterior to the posterior border of the liver parallel and to the right of the gall-bladder was found. The abscess was opened and drained by an opening both in front and behind near the angles of the ribs. The patient recovered.

CASE 4. *The Effect of Sterile Pus in the Cavity of the Abdomen.*—A sailor, aged 35, recently in the Royal Navy, had to leave his ship with all the signs and symptoms of liver abscess. At first he refused to be operated upon, and it was not until the severity of the illness became alarming that he consented. On cutting down upon the swelling in the right hypochondrium an abscess was found on the under-surface of the liver; the wall of the abscess had attained adhesion to the peritoneum in the right lumbar region, and the pus extended as low and as far back as the upper end of the right kidney which was incorporated with the swelling. Moreover, the pus had burst into the cavity of the peritoneum. The contents of the abdomen from diaphragm to pelvis were covered over by a slimy, muco-purulent-looking fluid. There were no signs of peritonitis, no adhesions, no flocculent pus, nothing except this passive effusion of slimy, muco-purulent-looking fluid in great quantity. The pus from the abscess cavity and the semi-fluid material from the surface of the peritoneum were examined bacteriologically, and both were pronounced sterile. This is, so far as I know, the first recorded case of the kind, and it is of special interest.

The treatment in this case consisted of free incisions in the abdomen in right and left lumbar regions, and in the middle line below the umbilicus, flushing the abdominal cavity with saline solution, and the insertion of large drainage tubes. The liver abscess was drained separately. The patient is now (June 11th, 1906) convalescent.

CASE 5. — A man, aged 37, resident all his life in Britain, had signs and symptoms of abscess of the liver in 1904. The abscess was not operated upon, and the pus burst upwards through the lung. The expectoration of pus ceased, and the patient for a time was fairly well. After four months the local signs and symptoms returned, and again he went into hospital; no operation was performed, and again he seemed to recover, but without any expectoration of pus. He continued to have hepatic pain and fever at intervals until May, 1906, when I found him with increased temperature, an epigastric swelling, local pain, and general discomfort. After five days he came into hospital, by which time the swelling had disappeared, the temperature had fallen to normal, and the patient said that the day before he came into hospital he had passed at stool a large quantity of "the same material he had on a previous occasion coughed up." It was plain the abscess had burst into the bowel, the colon in all probability. So far as I can learn, this is the only instance of a hepatic abscess which has been known to burst in two directions, namely, upwards through the lung and subsequently downwards into the bowel.

When cut down upon, an abscess was found on the under-surface of the left half of the liver near the posterior border; the liver, stomach, and colon being adherent to the wall of the abscess. The treatment consisted in exposing the swelling, packing the wound, and at the end of a week opening and draining the cavity. The pus from this abscess was sterile—a peculiar and most unexpected condition, seeing that there had been a double source of possible contamination, namely, by way of the lung and by way of the bowel. The patient is still under treatment.

THE ANATOMY OF THE BITING FLIES OF THE GENERA *STOMOXYS* AND *GLOSSINA*.

By Lieut.-Colonel G. M. GILES, I.M.S. (Rtd.).

(Continued from p. 173.)

THE œsophagus, after its commencement in the pharynx is a rather delicate tube. As seen in fig. 24, A, it is lined with an extremely delicate membrane, which is probably smooth in the fresh state, but is much wrinkled as seen in a transverse section on account of the shrinking action of the reagents employed on the softer tissues. In some of the folds thus produced there will always be found minute bodies which stain strongly with nuclear dyes and possibly are nuclear bodies. The main thickness of the walls of the tube is, however, formed of a ring of faintly granular material which shows fairly clearly a longitudinal striation, as seen in transverse section. These fibres are probably muscular. In the same sheath with these and lying always towards the lumen of the tube are some oval nuclei provided with a distinct nucleolus.

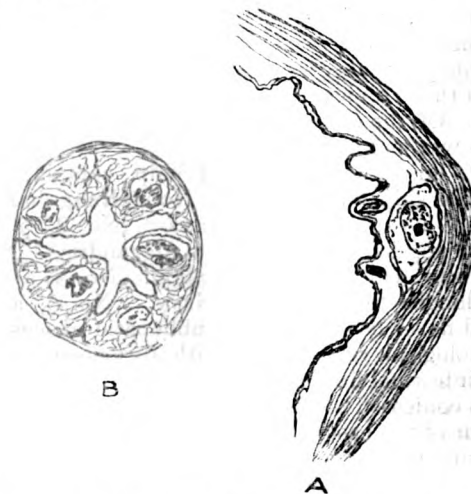


FIG. 24.—A, portion of wall of free œsophagus in transverse section: B, transverse section of the œsophagus as it passes through the nerve collar.

There are rarely more than two of these, usually almost opposite each other, in a fairly thin transverse section of the organ, and I believe them to be muscle nuclei. Outside these are some scattered cells of about the same size as these muscle nuclei, but they do not seem to be concerned in the structure of the tube, and are more probably lymph cells.

The narrow portion of the œsophagus, when it passes through the nerve collar, has a very different structure. The muscular and chitinous coats are both so thin as to be barely perceptible, and the place of the small nuclei, to be seen between the folds of the chitinous inner lining of the first part, seems to be taken by a continuous coat of large cells which have the appearance of epithelial elements. The lumen is here stellate in transverse section, and, on account of the size of the above-mentioned cells, extremely contracted.

The histology of the nerve centres does not differ from that of other diptera, a prominent character of which is the smallness of the component cells. In the layer of grey matter that surrounds the white commissural masses, two distinct forms of cells can be distinguished. In one of these, which one would be inclined to believe motor in function, the structure consists of multipolar cells, usually about the diameter of a human leucocyte. They have large nuclei, but still possess a considerable volume of protoplasm. Their prolongations give off fibres which occasionally can be traced for some distance. A good example of a ganglionic mass of this structure is to be found on the surface of the ventral nerve cord in the middle line.

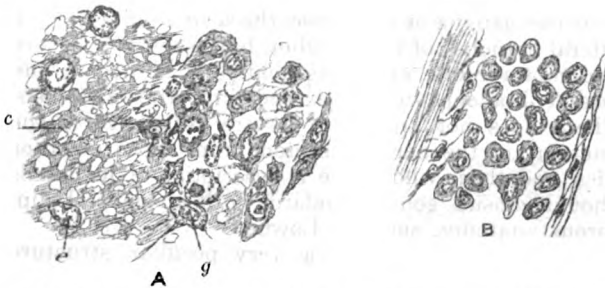


FIG. 25.—A, Portion of the ventral commissure and of the motor median ganglionic mass in that situation; c, commissural structure; g, motor ganglion cells; e, elements embedded among the commissural fibres. B, Cortical layer of anterior surface cerebral lobe.

The greater part of the sides of the cerebral masses is occupied by the ganglia of the compound eyes, the retinulae of which are continuous with the cerebral mass, but this has been too frequently described to render desirable any further description here. An account, running to some 70 pages, will be found in Lowne's work already quoted, commencing p. 515.

On the anterior surface of the brain, however, between the compound eyes, is a ganglionic layer which is probably sensory in function. The component cells of this are quite different from those of the presumed motor areas, the cells being smaller (about the diameter of a human red blood corpuscle) and apparently for the most part quite without prolongations, though a few scattered cells of larger size show an irregular outline, which suggests the existence of these. There are four or five rows of these, and between them and the white matter lies a row of very small and distinctly multipolar cells. The outer surface of the brain is bounded by a membrane formed of closely adherent spindle-shaped cells, with large oval nuclei. In other places the thickness of the ganglionic masses

may be as much as 20 or 30 rows of cells deep. In using the word "row" it is not implied that the cells are arranged in regular strata, as their disposition is quite irregular, but refers merely to the number of cells which may be counted in the width of a section. In specimens stained with borax carmine, a number of black pigment granules will be seen in these cells, and impart to them a very characteristic appearance, which is useful in recognising similar ganglion cells, in other situations than the brain, as, for instance, in the subcuticular tissue, beneath the sense organs of the antenna, but in staining with hæmatin and most of the aniline dyes, they cease to be distinguishable, on account of similarity of colouration with other deeply stained granules. Between the various bands of fibres of the white matter, may be found a number of ganglionic masses, composed of cells of each of the above descriptions, though the motor type predominate. Lastly, scattered between the fibres are a number of large cells or nuclei (e), presenting a large, clear, central area, and round their periphery a number of deeply staining granules, but these are probably not nervous structures at all, but of a trophic function.

In Mr. Austen's monograph of *Glossina*, mention is made (p. 63) of a sense organ placed near the base of the third joint of the antenna, but without any detailed description of its structure. In the corresponding position in the antenna of *Stomoxys* a similar organ is to be found, which, though I have made no examination of it in the former genus, has probably a similar structure. Judging from Lowne's figures, this organ is represented also in the blow-fly, but differs somewhat in details of structure.

In *Stomoxys* the aperture of the organ is oval and is hidden by closely set, long, flexible hairs. This slit opens into a sausage-shaped saccule, within which is a T-shaped projection which springs rather from the anterior side of the saccule, the stem being short and the top of the latter long and generally conforming to the outline of the cavity, so that it appears as an isolated piece in transverse sections that pass elsewhere than in the plane of the stem. The whole of this cavity is lined with peculiar stiff hairs, the bases of which are short and conical, while they end in a long bristle. These chitinous structures overlie a layer of ganglionic cells, from each of which a fibre runs to a hair, while proximally each ganglion cell receives a fibre from a ganglionic enlargement of the antennal nerve, which fills up the greater part of the cavity of the second antennal joint. The function of the organ is probably that of hearing. In addition to the saccule the whole surface of the organ is covered with sensory hairs, each of which has a similar nerve supply, and in the neighbourhood of the saccule are a number of peculiar sense organs of a quite different character. A number of these are to be found amongst the bases of the long soft hairs that guard the mouth of the saccule, while many others of considerably larger size are contained in a porous plate on the outer face of the antenna which is comparatively free from hairs. Though varying a good deal in size, even in the porous plate, they all have essentially the same structure, and consist of an ovoid crypt, communicating by means of a pore with the exterior, and springing from the base of which is

a club-shaped body which fills most of the interior of the crypt. From the club-shaped end of this body springs a soft conical hair, the fine termination of which projects into the pore. Two rows of very large organs of this sort are also to be found on the posterior face of the antenna. The nervous supply of these peculiar structures is exactly similar to that of the other hairs. They are believed to be olfactory organs, but in view of their graduated size it would be open to any one to suggest that they are chordotonal

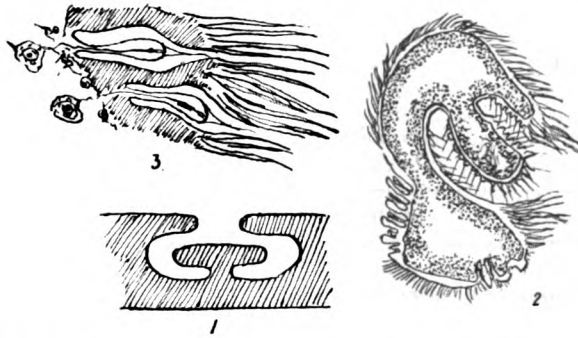


FIG. 26.—The sense organs of the antenna. (1) Diagrammatic longitudinal section; (2) transverse section, $\times 250$ diams.; (3) vertical section of position of outer wall of antenna, $\times 700$ diams.

organs. That certain insects lose the sense of smell, when deprived of their antennæ, has been fairly proved by Lubbock and others, but as to which of the various sense organs found on the appendage may serve this or that function must always remain a matter of pure conjecture.

The thorax in all diptera is little else than a solid mass of muscle. If we snip off with sharp scissors, the legs, with a little of the ventral wall of the thorax, the ends of a number of vertical bundles are seen cut across. These are the coxal muscles of the three pairs of legs, and if these be separated in the middle line there will be seen opposite the anterior legs a sausage-shaped mass of considerable size, the great thoracic ganglion. Clearing this away and just under its anterior end will be seen a nodule of the size of a small pin's head, and closer inspection will show that there extends backwards from it a glistening tube which is most characteristically marked with closely placed mammillations. This is the mid-gut, and lying on it will be seen three delicate tubules, the middle and most delicate of which is the crop duct and those at the sides the now glandular salivary glands. The mid-gut can be traced forwards beyond the nodule, and with sufficient care can be shown to be continuous with the œsophagus, as it escapes from the nerve collar. The nodule is placed at the junction of the stomodæum with the mid-gut, and is known as the proventri-

culus, a very peculiar organ, which will be described in detail further on. If these parts be removed it will be seen that all else is muscle. Pressing apart the masses in the middle line, layer after layer (four in all) of longitudinal muscle can be clearly seen, filling up the greater part of the space. Further out there are numerous more or less obliquely vertical bundles. The whole constitute the muscles of flight; for the wing roots are not acted on directly by the muscles, as is the case with the ventral appendages, but in a very indirect manner by their action in producing an alteration in the form of the chitinous exoskeleton of the thorax, and thereby actuating a complicated series of sclerites which are connected with the wing roots. Any attempt to describe these muscles and their action here is, however, clearly out of place; and indeed, though much has been written on the subject it is very doubtful if any one has yet solved the problem of their mechanics.

The thoracic ganglion is mainly contained in the mesothorax just above its sternum, but the oval ends extend before and behind into the contiguous portions of the pro- and meta-thorax. Sections show that there are three principal ganglionic masses: a median commissural ganglion, which is divided into three parts, and lateral ganglia which are so continuous as to leave but little indication of the original separation into the ganglia of the three thoracic somites. The lateral branches of the ganglion have separate sensory and motor roots, and ends behind in a median and lateral branches which extend into the abdomen. There does not appear to be any difference in the anatomy of the nervous system from those of other flies, and those who desire a description of its details should consult some standard work on general dipterous anatomy, such as Lowne.

The proventriculus is a very peculiar structure which forms a sort of three-way junction between the œsophagus, crop duct, and mid-gut, and is situated in the prothorax, lying upon the cephalothoracic nerve cord and the front of the thoracic ganglion. Apart from certain differences of moulding, it is essentially the same in all Muscidae, so

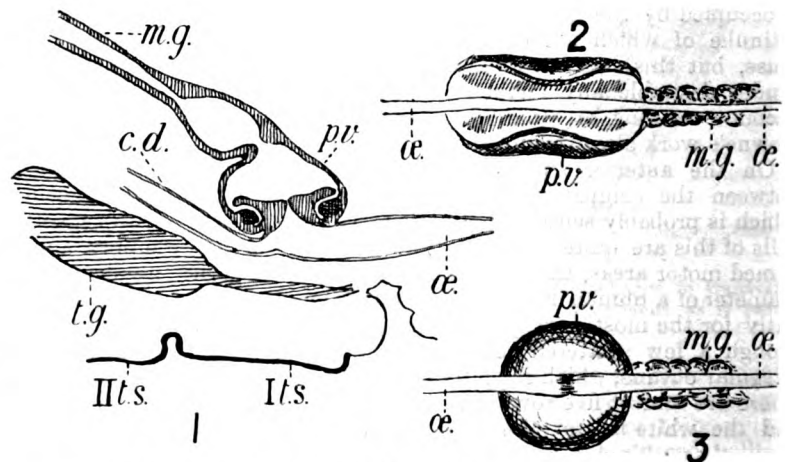


FIG. 27.—(1) Camera lucida drawing of a sagittal section of the proventriculus of *Stomoxys* and its connections, $\times 50$ diams.; (2) and (3) freehand drawings of the proventriculi of *Glossina palpalis* and *Stomoxys calcitrans* respectively viewed from below; *IIts.*, *IIIts.*, first and second sternal sclerites; *cd*, crop duct; *mg*, mid-gut; *œ*, œsophagus; *pr.*, proventriculus; *tg*, thoracic ganglion.

that our description of the organ will, with a few added words as to differences, serve equally well for *Stomoxys* and *Glossina*. The body of the organ consists of a fairly thick-walled bulb, from the dorsal surface of which springs the mid-gut, while the crop duct and œsophagus are connected with the ventral.

As will be seen from an inspection of fig. 1, the organ in *Stomoxys* closely resembles a retort, the beak of which is formed by the mid-gut.

The œsophagus and crop duct, which really form a continuous tube, give one the impression of entering the under-surface separately, as seen in dissecting, but do not really do so, the illusion being produced by the actually continuous tube being tucked up into the funnel-shaped aperture in the lower surface of the proventriculus.

In *Glossina* the junction is T-shaped, and there is a distinct vertical duct which runs up from the upper surface of the junction between the œsophagus and crop duct, so that, even to the dissector, the continuity of the latter is quite obvious. In both genera, however, the vertical diverticulum enters the proventriculus by piercing the centre of a very peculiar structure, which has exactly the form of a bone button, the sewing which would attach such a button to the cloth being represented by a stout peduncle, through which the vertical diverticulum passes to enter the cavity of the proventriculus. Concealed beneath the margin of the button is an annular thickening of the floor of the cavity, which is formed of peculiar clubbed cylindrical epithelial cells.

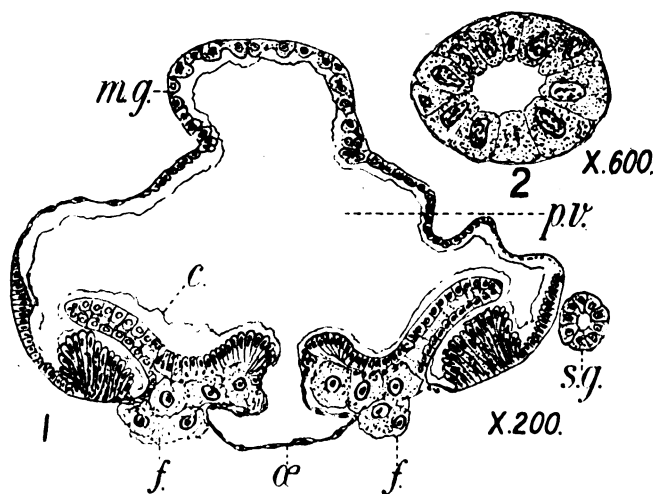


FIG. 28.—(1) Transverse section of proventriculus, $\times 200$ diams; (2) transverse section of salivary glands; c, chitinous lining membrane; f, fat body; mg, mid-gut; œ, œsophagus; pv, cavity of proventriculus; sg, salivary gland.

A ring of somewhat similar structure, in the middle of the upper surface of the button, surrounds the almost punctiform opening of the vertical diverticulum. The lining, indeed, of this curious structure presents a sort of epitome of the various types of epithelial cell. Both surfaces of the remainder of the button are paved with cubical cells; outside the thickening beneath it the floor of the cavity is composed first of cubical and then of columnar cells; the lower part of the vault is composed of elements of the squamous form, and these

change again to the cubical type, which, in its turn, gradually changes to the much larger irregular glandular type of cell which lines the commencement of the mid-gut.

The œsophagus and crop duct may be taken as chitinous stomodæal tubes, and it is a curious circumstance that this chitinous lining is continued through the vertical diverticulum into the proventriculus, and lines its entire cavity, though there appears to be no organic connection between this lining and the epithelial coat already described.

Though extremely delicate the structure is perfectly definite and continuous; and though fluids doubtless easily osmose through it, it seems rather difficult to understand how the products of the epithelial waste are disposed of. Taking the structure as a whole, it is difficult to resist the idea that it must, in some way, have a valvular function, though it is difficult to say how. The button is a solid mass of epithelia, and a most careful search through many series of sections has entirely failed to demonstrate any muscular components. The only way in which the puncture can be imagined to be closed by the structures as they stand is that the ring of club-shaped epithelia, beneath the button, if secreting actively, might swell and so cup the button more deeply, and that any such alteration of form would certainly tend to close the puncture. Weismann believes it to be glandular, and Lowne regards it as a gizzard, and there can be no doubt, as the latter points out, that it is homologous with the gizzard of manducatory insects, but it is difficult to see what a blood-sucking insect wants with such an apparatus, and as a matter of fact, but little changed red corpuscles of the victim are constantly to be found on the mid-gut.

In *Stomoxys* the proventriculus opens into the mid-gut by a very narrow opening, followed immediately by a bulb-like dilatation; after which the gut contracts to a uniform diameter for the rest of its passage through the thorax, but no such dilatation appears to exist in *Glossina*. In this genus, too, the button is oval instead of circular, and the entire organ is oblong with rounded corners and very slightly contracted in the middle. In addition to this (fig 27, ³), whereas in *Stomoxys* the organ is convex below in all directions, in *Glossina* the sides are curled round to protect the œsophagus and crop duct, so that, seen from below, it has much the form of a Spanish priest's hat.

The salivary ducts, almost immediately after entering the thorax, change from minute chitinous tubes to large tubular glands, and run back below the œsophagus to the sides of the proventriculus, and then below the digestive tubes to the abdomen. They are 0.08 mm. in diameter, and are lined with a cubical secretory epithelium, the components of which assume a keystone form on account of the smallness of the lumen. They have large nuclei with prominent chromatin fibres, and show neither anything in the way of a basement membrane nor any chitinous lining (fig. 28, ²).

On the dorsal side of the digestive tube, and lying in absolute contact with it, is the aorta, but the peculiarities of its structure will be better described in connection with the abdominal dorsal vessel.

(To be continued.)

THE PURU OF THE MALAY PENINSULA.

By T. D. GIMLETTE, M.D.

(Continued from page 175.)

CASE 3. *Puru in a Malay Adult.*—Mehlinah, female, Kelantan Malay, aged 47, married, twelve children, was first seen on April 14th, 1905, at Lubok Kawah in Kelantan. The patient states she has been ill for about a year, and has been inoculated with "puru mata kerbau" by her youngest child, aged about 2, who, with his sister, aged about 6, is now recovering from the disease. She says that all her children have had puru, but up till the present time she herself had not had it. Her husband suffered from it in boyhood; a married sister, however, has not yet had puru.

The patient looks ill. The eruption is sparse. She is crippled and complains of great pain in the hands and feet, and in the wrist, elbow and knee-joints. The joints are swollen and very tender. She is kept awake at night by the pains, and has been confined to the house for many months. She is still suckling the youngest child. On the left breast there is a flattened puru tubercle covered with a dark dry scab. There are some similar lesions on the abdomen about the level of the umbilicus, where the child would naturally be held in nursing. The shin-bones are much swollen and tender, as well as the phalangeal joints. The scar of the "puru ibu" in this case was on the right shin. The ibu sore had healed before the decline of the other sores, which, with the exception of those on the body, had mostly come out on the neck. This patient was given a mixture containing iodide of potash, 10 grains, night and morning, and an ointment composed of ung. hydrarg. 1 drachm, and zinc ointment to 1 ounce. She was greatly benefited by it, and by the end of April was free from pain and able to walk alone. At the end of May the sores had all healed.

CASE 4. *Puru in a Sikh.*—Pak Singh, a Sikh, of no occupation, aged 39, was admitted to the General Hospital at Kuala Lipis, Pahang, on February 2nd, 1900. He had been ill for a few days, and was supposed to be recovering from chicken-pox. He was removed to an isolation ward, where the eruption developed into one which was generally recognised as puru. The patient gave a definite history of primary syphilis, and was not discharged until April, and then only partly cured, although treated with mercury as well as iodide of potash during the whole of March.

This case appears to be analogous with the clinical case of the sea dyak given by Dr. Barker in his report from Sarawak.

THE PATHOLOGY OF PURU.

There is little in the pathology of puru which has not already been described under the heading of frambæsia or yaws.

The disease being seldom fatal, it is impossible to record the result of any *post-mortem* appearances, more especially because *post-mortem* examinations are almost prohibitive among Malays owing to religious custom and strong racial prejudice.

Microscopical Appearances of Puru Tubercles.—Some of the growths which were removed from the chin and back of Case 2 were sent to the Institute for Medical Research, Federated Malay States, and were, by the courtesy of the Government, examined by Dr. C. W. Daniels, the Director of the Institute. His report is as follows:—

"*Tubercle from Back.*—Nodule mainly composed of a round-celled growth in the tissue, covered almost completely by altered epithelium. The growth is not one mass, but is formed of a series of nodules of irregular size and shape loosely connected by fibrous tissue.

"On tracing the epithelial layer from the normal skin at the edge of the nodule we find that over the tumour it is more irregular in thickness and that the papillary processes are larger and very irregular. All the layers are altered. There is no properly formed keratinous layer and none of the intermediate cells in process of keratinisation. The epithelial cells over the tumour are swollen, stain irregularly, and are often vacuolated.

"They are not arranged in definite layers and the palisade arrangement of the deepest layer is poorly marked.

"The growth itself is composed of round cells with scanty protoplasm. The cells and nuclei stain well with basic stains. Mitosis is common and there are no areas of necrosis, caseation, or suppuration. The cells vary a little in size and occasionally much larger cells with single nuclei are seen. In the depth of the growth there is some thickening of the fibrous stroma. The growth is supplied with blood-vessels.

"*Tubercle from the Chin.*—This specimen is from a more hairy part and hair follicles extend through the growth. It differs from the other specimen in that the growth is less abundant and the fibrous stroma more so and that the hair follicles extend through the depth.

"No micro-organisms were found in the deeper parts of the sections of the growths."

This description agrees with the most recently published account of the microscopical appearances of frambæsia or yaws tubercles [20]. It is important to note that no congener of the *Spirochæta pallida* was found. The original sections are sent with this paper.

THE TREATMENT OF PURU.

Malays have given much attention to the treatment of puru, both with drugs derived from their own flora and by the use of a few imported medicines, but their efforts, which are mainly empirical, have not proved very successful in every-day practice.

In the hope that a definite therapeutic preparation might be made out of one or other of their local products, I recently sent some notes to the Therapeutical Society of London, on some of the methods employed by Kelantan Malays in the treatment of puru. Botanical specimens of most of the plants referred to were sent to England with the paper. They were all obtained in Kelantan, most of them from a hamlet—Kampong Kutun—near Kota Bharu, the capital. These original notes, with additions, are now embodied in the present essay.

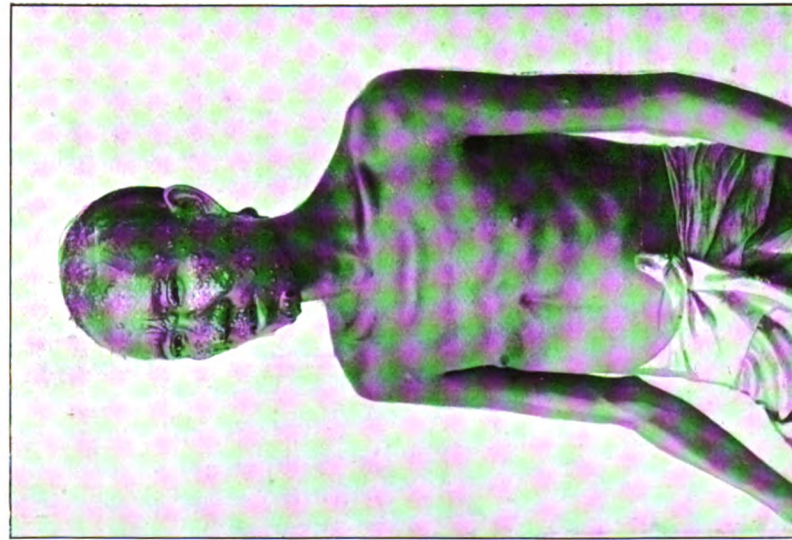


FIG. 4.—To illustrate Case 2, showing the sores of puru.

To illustrate article by T. D. GIMLETTE, M.D., "The Puru of the Malay Peninsula."

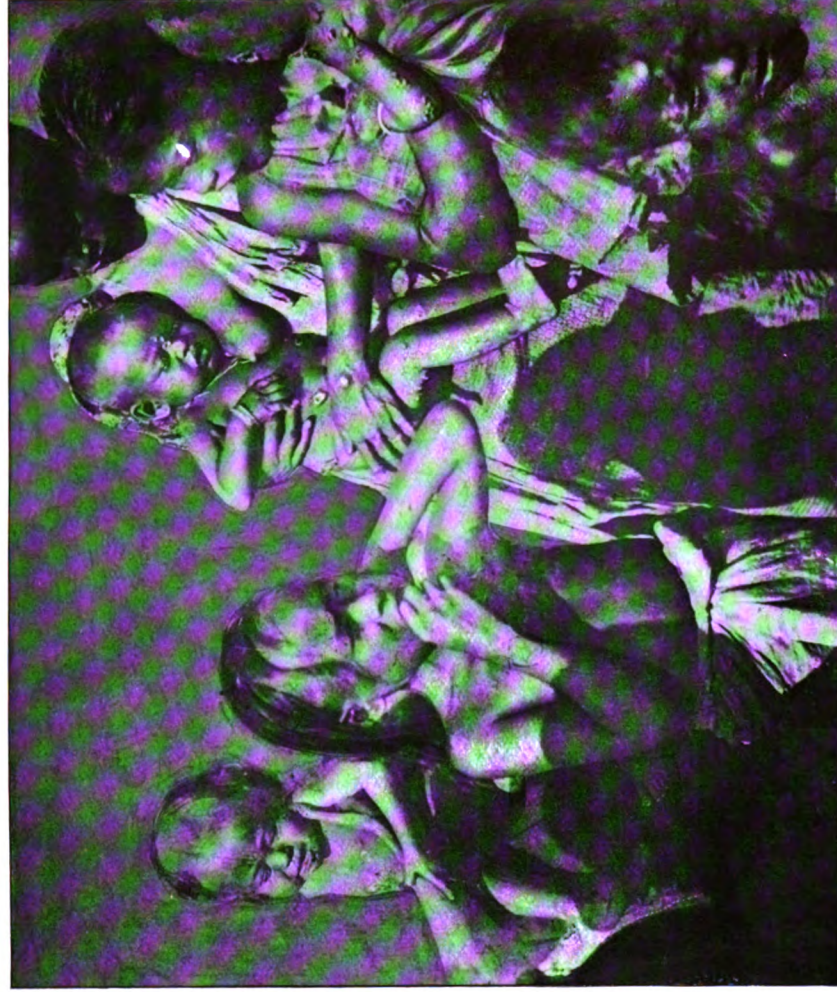


FIG. 5.—A group of Malays at Dusun Nyor, in Kelantan, showing the prevalence of puru among the children of the village.

Native Therapeutics.—In the earliest stage of the disease the only native form of treatment employed for the relief of the prodromal fever and muscular pain is the superstitious Malay practice of "menjampi," or charming by incantations.

The medicine for the first stage of puru is said by native Malay doctors to be the leaf of the merbor (?), plant and those of the jenera (?) rotan jenerang (*Demonorops draco* [L. Palmæ], the dragon's blood). These leaves are chewed up and spat on to the swelling or ibu.

It is generally held by Malays, however, that active treatment is of no avail until the full development of one or more puru sores has been attained. The sore which is often watched with the object of timing the commencement of treatment is the "puru ibu," or mother sore. When this so-called parent sore is developed, their most valued remedy is the external application of a latex or kind of gum which is called "getah hagu" in Kelantan, or "getah jintan" in Pahang. This is obtained from a climbing jungle creeper known in Kelantan as "akar agu" ("akar," a root, the generic name for scandent or creeping plants) and is very like *Hunteria roxburghiana*, though uncommon. It is prized by Malays, especially a red variety, and, like many other of their medicinal plants, is protected and cultivated. The latex is obtained by cutting the live stem and mixing it with water to allow for its inspissation, and it may be bought in this form in the native market at Kota Bharu in Kelantan. The remedy is smeared day by day on the sores of the general eruption. So far as my experience in Kelantan goes, "getah agu" causes the sores of puru to shrink and is of value as a local application.

Another latex which is valued is collected from a jungle creeper called "akar gam" (*Willoughbeia firma*); in this case the remedy is obtained by incising the fresh fruit or the stem. It is generally known under the name of "buah gam" or "gehan" ("buah," a fruit), and is commonly applied to the sores of puru in the same way as "getah agu." In some cases in which the sores are chronic and do not respond to treatment the fruit is gathered, dried, then roasted and powdered, being finally made into a paste with a little water for local application. In other cases of chronic and recurring sores, the ashes obtained by burning the stem of "rotan sega badak" (*Calamus orantus*) are used. "Rotan," in Malay, is a generic name for rattans of the genera *Calamus* and *Demonorops*.

Another local Malay remedy is well known under the name of "terosi," sulphate of copper. In the general treatment of puru, "terosi" is reduced to fine powder, and then mixed with palm oil or with a latex called "getah pulai," which is obtained by cutting the stem of the young pulai tree (*Alstonia macrophylla*). External applications of this kind containing "terosi" cause a great deal of pain, prevent sleep, and on this account are not often used, rarely if ever being employed in the early stages of puru. With the object of preventing pain these applications are sometimes prepared by first burning the "terosi" in a slow fire until it is blackened, then pulverising and mixing it into a paste with either cocoanut oil or the juice of the common lime fruit called "limau nipis" (*Citrus acida*).

The most important of all the Malay drugs for sale in the Kota Bharu market is "tuba tikus," which, like terosi, is imported by way of Singapore. "Tuba tikus" is pure arsenious acid or white arsenic, generally seen in rather odd forms which seem to be due to its having been collected from the flues of some dyeing works. The name appears to be used idiomatically by Malays; "tuba," is the name of a jungle plant, the root of which possesses certain stupefying properties; "tikus" signifies a rat. It is used externally in the treatment of puru, either by itself in the form of a powder, or as an addition to various kinds of roughly made "pastes" which are prepared from certain native plants. These vegetable "pastes" are freshly made as occasion demands; in one instance by grinding down with a little water the root of a wild red vine, called in Malay "puchok merah" ("merah," red), a plant which is identical with *Leea rubra*, and in another case by treating in the same way the root of a low shrub called "chekor manis" (*Sauropus albicans*); "manis" is the Malay for sweet, or light in reference to some colours.

"Tuba tikus" is used as a poison by criminals, and is not administered internally as a medicine by Malays. It is the "berangan puteh" of Java.

The sulphurets orpiment and realgar are also used in puru, but all the external applications containing arsenic, being caustic, are much disliked on account of the pain which they occasion. "Tuba tikus," like "terosi," may be burnt and applied in the same way, either with or without oil.

"Mali puchok merah" is given by the mouth for puru, as well as being used externally, and among other internal remedies are "melor hutan," a wild jessamine (*Jasminum bifarium*; *Oleaceae*) and the black variety of kemantu. This latter is a tree of Indian origin (*Clausena excavata*). It is called "pokoh kemantu hitam," or the black kemantu tree, "pokoh" meaning a tree, and "hitam" black. There are other varieties of this tree which are not used in medicine. "Akar jela batu" is also administered internally for puru; but there is no fixed dose. In each case the roots of these plants are ground down on a "batu asah" (a stone on which medicines are pounded or ground down) and then infused in cold water. Occasionally a mixed infusion is used in puru of kemantu hitam and "tuko takal" (*Baccaurea wallichii*; *Euphorbiaceae*), a jungle tree which is fairly common.

The only treatment of the disease by Malays when it affects the joints is by the constant application of "ayer tawar," or plain water over which certain charms have been said.

In Kelantan sovereign remedies are common. A typical native prescription is as follows: Take the knee-cap of a tiger, the bones of a duyong (the dugong), the bones of a goose, the bones and horns of a Kambing gurun (a very rare wild goat, *Nemorhedus bubalinus*), the horns of a rusa, a wild deer (*Cervus unicolor*), while still soft (lembong); add belirong bang (sulphate of arsenic), and cheudana janggi (red sandal-wood), and mempūs harimau (a kind of wood). Grind these ingredients down with some boiling rice water (ayer dideh), take a small amount of ashes

from the hearth, mix, and administer the draught by the mouth.

Various applications are made for puru of the foot. The following method of treatment known as "tanak puru" ("tanak," to cook) is a favourite one with some Kelantan Malays. A small round hole about a foot in depth is made in the ground, and a slow fire is kindled at the bottom of it; half a coconut shell with a hole in it, or a suitable piece of bamboo, is then fitted over the red-hot embers. On the top of this improvised screen the affected foot is rested in such a way as to expose the sore to the heat of the smouldering fire. Kemantu leaves are often put on the fire as well as those of "kedondong," a tree belonging to the genus *Canarium*; in addition to the leaves the bark of the latter is sometimes burnt on the embers. Relief of pain is obtained after three or four lengthy exposures.

Lime, which is commonly used in betel chewing, is also a popular remedy for puru of the foot. It is mixed with oil or with the juice of "keladi puyoh," a common Malay aroid of the genus *Alocasia* (*Typhodium roxburghii*), and plastered on to the sores. Stones may be heated and applied as hot as can be borne. The actual cautery in the shape of red-hot iron nail is occasionally used, and even excision is attempted by means of "parangs" or rough iron choppers which are usually used by natives in felling brushwood.

It is of general interest to note that the drugs used in puru are not used by Malays in their treatment of syphilis. The chief Malay drug used for syphilis is "pokoh restong" (*Malacoe* sp.) which grows wild, but is often cultivated, and it is praised by natives as being a valuable medicinal product. The root is used, mostly in the form of a lotion, especially in cases of ulceration and destruction of the nose. This as well as "trong pipit puteh" (*Solanum indicum*) is also given internally for syphilis, but they are not employed in the treatment of puru. "Puteh," in Malay, literally means white, and the word "trong" is used to designate the plants of the *Solanaceæ*.

Hospital Treatment.—At the present time puru is rarely, if ever, treated in the isolation wards of the Malay peninsula. It is hardly necessary to dilate upon the importance of isolation in the case of a directly contagious disease of this nature. I think it may be assumed that some isolation of puru cases (although prophylactic treatment of this kind must always be difficult among Malays) may be eventually achieved in these hospitals.

Preparations applied locally of mercurial ointment will be found of great value in the treatment of the disease, especially in combination with zinc ointment. Sores which are healing during the decline of the disease are generally benefited by daily applications of tincture or liniment of iodine. Puru of the foot is often relieved by the application of pure carbolic acid or sulphate of copper. I have not found alkaline lotions of sodium bicarbonate to be of much benefit. Iodine of potash is generally of great value, especially during the stage of "senggai puru." It quickly relieves, as a rule, the rheumatic-like pains if given in doses from 5 to 10 grains (to adults) twice or thrice daily. Attention to general hygiene and cleanliness is nearly always indicated. The syrup of iodide of

iron is often of great service in the treatment of puru during childhood.

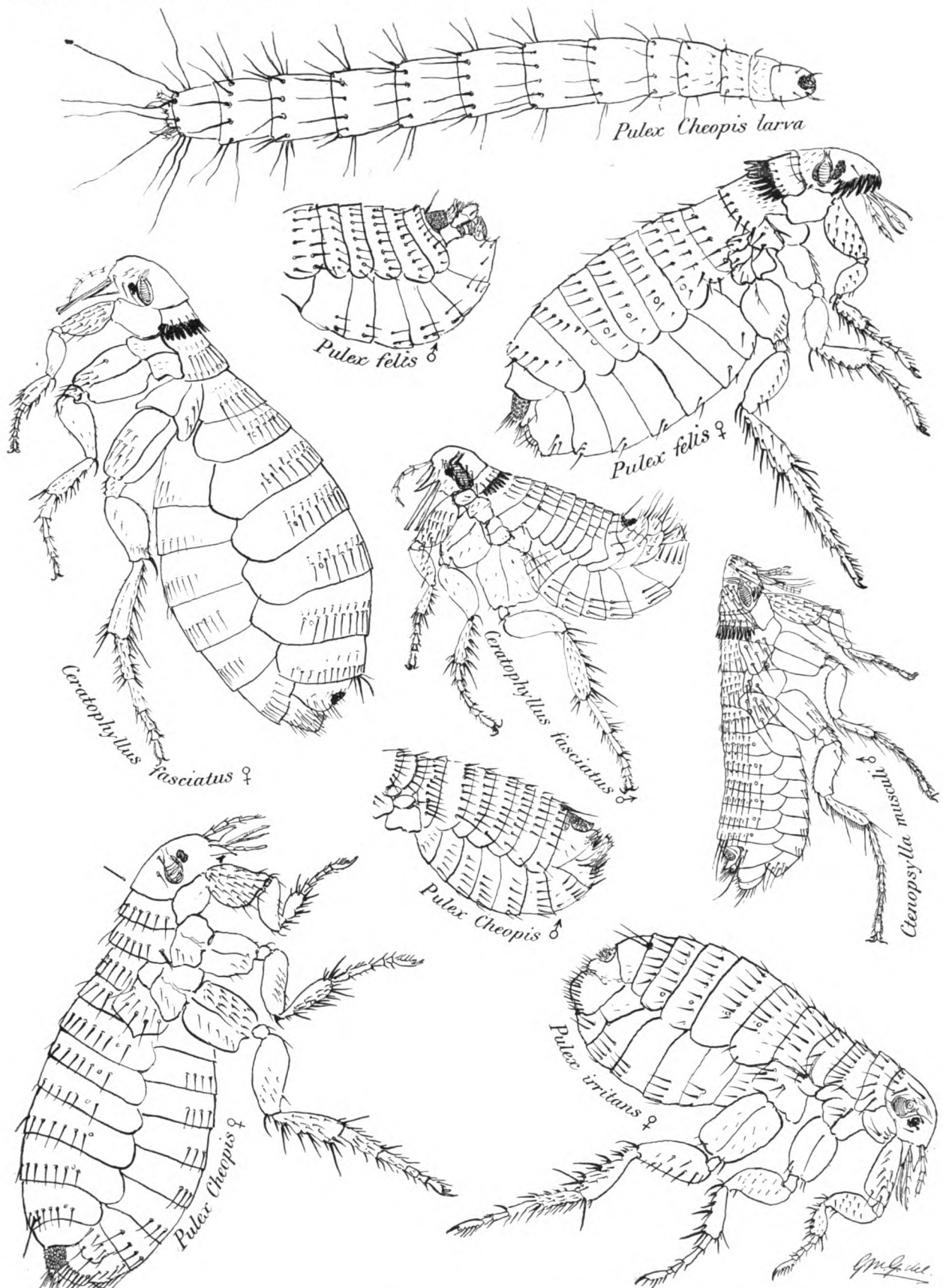
Although my practical acquaintance with the disease is limited to the Malay peninsula, I would conclude that puru is identical with frambesiae or yaws, and I would plead that this tropical disease should at least rank as a nosological entity in the medical returns of British Malaya.

I am indebted to Mr. H. N. Ridley, F.L.S., Director of the Botanic Gardens, Singapore, for his kindness in classifying very many of the drugs, and to Mr. P. Burges, M.A., Government Analyst, Straits Settlements, for his examination of the mineral known as "tuba tikus," or ratsbane; also to Mr. R. W. Duff, Managing Director of the Duff Development Company, Limited, to Mr. H. W. Thomson, Assistant Adviser to His Highness the Rajah of Kelantan, and to Ungku Sayid Hussein, a member of the Kelantan nobility, for their cordial collaboration.

I must also thank Dr. C. W. Daniels, the Director of the Institute for Medical Research, Federated Malay States, for making the examination of the pathological tissues and for many kindly and valuable criticisms.

REFERENCES.

- [1] HUGH CLIFFORD. "Further India," London, 1904.
- [2] BONTIUS. "De Medicina Indorum," 1718.
- [3] MARSDEN. "History of Sumatra," p. 156, London, 1811.
- [4] "Selected Essays," p. 291, The New Sydenham Society, London, 1897.
- [5] Hirsch's "Handbook of Geographical and Historical Pathology," vol. ii., p. 197, The New Sydenham Society, 1885.
- [6] POWELL. *British Journal of Dermatology*, No. 98, vol. ii., No. 12.
- [7] JEANSELME. "Cours de Dermatologie Exotique," p. 161, Paris, 1904.
- [8] BROWN. *British Journal of Dermatology*, No. 56, vol. v., No. 6.
- [9] ALLBUTT. "System of Medicine," p. 486, vol. ii., London, 1897.
- [10] JAMES. "Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India," No. 13, new series, Calcutta, 1905.
- [11] "Medical Report on the Sarawak Government Hospitals and Dispensary, 1898," Kuching, Sarawak, 1899.
- [12] *British Medical Journal*, vol. i., p. 1588, 1898.
- [13] G. PERNET. "The Differential Diagnosis of Syphilitic and Non-syphilitic Diseases of the Skin," p. 152, London, 1904.
- [14] DANIELS. "Studies from Institute for Medical Research, Federated Malay States," vol. iii., part i., p. 59, Singapore, 1904.
- [15] "An Atlas of Illustrations," Fasciculus xiv., The New Sydenham Society, London, 1902.
- [16] Crawford's "Malay Dictionary," London, 1852.
- [17] WRIGHT. *Journal of Medical Research*, vol. x., No. 3, new series, vol. v., No. 3, pp. 472-482, December, 1903, Boston, Massachusetts, U.S.A.
- [18] *British Medical Journal*, vol. ii., p. 615, 1901.
- [19] SCHEUBE. "The Diseases of Warm Countries," English translation, second revised edition, p. 290, London, 1903.
- [20] WOOLEY. "Frambesiae: Its Occurrence in Natives of the Philippine Islands," Bureau of Government Laboratories, Serum Laboratory, No. 20, October, 1904, Manila, 1904.
- [21] *Therapeutical Society Transactions*, 1905, third session, London.



Outline figures of fleas possibly concerned in the transmission of plague.

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THE

Journal of Tropical Medicine

JUNE 15, 1906.

THE HYGIENE OF THE ALIMENTARY CANAL.

PROFESSOR METCHNIKOFF chose the subject of "The Hygiene of the Alimentary Canal," for his second Harben Lecture. The etiology of appendicitis formed a prominent part of the lecture, and Metchnikoff's opinion is that intestinal worms are the most frequent cause of the disease. He cited instances in which Trichocephali, Oxyures and Ascarides have been found in the appendix, and drew attention to the prevalence of appendicitis in families and persons subjected to identical domestic environment. It is not necessary for belief in this opinion that the worm be actually found in the appendix either at operation or at *post-mortem* examination, for, after having caused inflammation in the appendix, the parasites frequently leave the appendix and thus may not be found there at the time of the operation. There can, of course, be no doubt that an intestinal worm need not impair health in any way, just as many mosquitoes, fleas, and ticks may prick man and animals without causing anything more than a transitory and not painful itching. But, on the other hand, it is equally certain that the bites of intestinal worms may lead to just as much evil as the pricks of Arthropoda carrying pathogenic microbes.

In the appendix the parasite sets up a zone of inflammation accompanied by an effusion of white

blood cells and the presence of different bacteria; the mucous membrane is attacked and the parasite (oxyuris or other worm) inoculates a microbe which produces a fatal infection. The rôle of the parasite is therefore similar to that of a flea which inoculates man with the plague bacillus. As an argument against this theory of the causation of appendicitis, it is asserted that the Chinese and certain other peoples never suffer from appendicitis, in spite of the frequency with which intestinal worms are found in them. It may, however, be stated (1) that *post-mortem* examinations are but rarely carried out in China, except in some few centres where European doctors practise; (2) that appendicitis is frequently a mild ailment, and European doctors are seldom called in; (3) the statement that appendicitis is so rare amongst Chinese requires confirmation.

The disinfection of the intestine Metchnikoff considers to be a simple matter, and can be produced by keeping a careful watch on our food and drink; both should at least be boiled before being consumed. He refutes the belief that boiled water is either tasteless or harmful, and contends that boiling is insufficient for sterilisation—there always remain spores of *Bacillus subtilis* and some others—but the ova of parasites and the pathogenic microbes will be destroyed, almost without exception.

Among fruits, strawberries are chiefly condemned as parasite introducers, from the fact that they touch the ground or litter when growing. In connection with this legend the use of strawberries as a cure for sprue would require justification, seeing that the fruit comes in contact with an already damaged intestine. As an intestinal disinfectant lactic acid is recommended by Metchnikoff as the most efficient, and he states that—

"Among the useful bacteria the place of honour should be reserved to the lactic bacilli. They produce lactic acid, and thus prevent the development of butyric and putrefactive ferments, which we should regard as some of our redoubtable enemies. It has been shown by an extensive series of experiments, which we cannot here treat of in detail, that certain lactic ferments easily accustom themselves to live in our intestines, and thus produce a beneficial influence. They prevent putrefaction, and thus diminish the excretion of sulphonic acid esters. These same ferments help to regulate the functions of our intestine and kidneys, rendering valuable service to the entire body.

"One can take such carefully selected lactic ferments either in milk that has become acid under their influence or in the form of a powder or compressed 'tabloids.' Dr. Tissier employs them in the treatment of the various intestinal troubles occurring at any age. To this end he advises the use of cultures of lactic microbes made in lactose peptone water.

"As putrefaction in the alimentary canal represents one of the causes of the general wear and tear of the human body, it was only natural to suggest the method that I have just referred to as a means of combating it. This method may now be summed up in a few words. It consists in the consumption of foodstuffs not contaminated with microbes or entozoa, and in the introduction into our alimentary canal of an artificially cultivated bacterial flora, foremost among which are the lactic acid microbes."

HOW TO RECOGNISE THE SPECIES OF PULEX POSSIBLY CONCERNED IN THE TRANSMISSION OF PLAGUE.

THE theory that fleas are concerned in the transmission of plague is one of some standing, but was for a considerable period generally discredited, as it seemed that laboratory experiments failed to confirm its probability.

Of late the theory has, however, come once more to the front, owing largely to the able advocacy of Captain W. Glen Liston, I.M.S., who contributed to the Bombay Natural History Society a paper on the subject, read on November 24th, 1904. A revised copy of this paper appeared in this Journal in the issue of February, 1905, p. 43, and an earlier note on the fleas of rats, contributed by Dr. Tidswell, may be found in the volume for 1903, p. 232.

It is not our purpose to enter into any detailed description of the various species that may possibly be concerned in the transmission of plague from the rat to man, but as neither of these papers was illustrated, and no easily recognisable figures can be referred to as readily accessible, it is thought that it may be of service to our readers to furnish them with reliable outlines of the five species that are most likely to be met with in the course of any investigation of the subject. The material from which the drawings were made consists of a number of slides presented to the writer by Captain Glen Liston, and partly of some rat-fleas collected by himself in Plymouth.

All are mounted as microscopic objects in balsam on ordinary slides, and hence are probably a good deal more compressed than the living insects would be, or than is the case in specimens preserved in spirit. The depth of the drawings from dorsum to venter is therefore, probably, in all cases more or less exaggerated. The various specimens were most kindly identified by the Hon. Mr. Charles Rothschild, the well-known authority on the group, to whom the writer desires to express his most grateful thanks for his pains in this respect, as well as for his help in indicating the points that should be most emphasised in preparing outline figures of fleas, and for the loan of his unique specimen of the larva of *Pulex cheopis*, the species which is indicated by Captain Liston as the most probable culprit in the matter.

The fleas are a small group of parasitic insects, the *Aphaniptera*, which are generally regarded as a sub-order of the *Diptera*, though it cannot be said that the relationship is a very obvious one, as, not only are the wings represented only by small scales on the meso- and meta-thorax, placed just above the coxæ, but the hinder pair are usually the larger, and in no way resemble the halteres of the *Diptera*. Added to this, the mouth-parts are very different, notably, in possessing, in addition to the palpi, a second pair of jointed appendages.

Although no monograph of the *Pulicidae* appears to have been as yet attempted, the total number of species must be considerable, as most genera of mammals and birds appear to have their own fleas, which are but rarely found on alien hosts. This, however, appears to be rather a matter of preference than of

necessity, as, if pressed by hunger, fleas will attack almost any species, and as they always quickly desert their host after the death of the latter, other animals and human beings are, under the circumstances, very apt to be attacked by species that ordinarily neglect them. The significance of this trait of their habits in relation to the transmission of plague is too obvious to need further comment.

On this account, not only may the fleas of cats, rats, and even birds be found on men, but the fleas of the latter may be met with on rats, and of course the fleas of mice and other rodents find a comparatively congenial home.

For our purposes, however, there are five species whose ready recognition is like, ere long, to become a matter of vital importance to the medical practitioner. These are: *Pulex irritans*, usually harbouring on man; *Pulex felis* (often referred to as *P. serraticeps*), commonly harboured by dogs and cats, but quite commonly met with on the human subject, as well as on rats, squirrels, and a variety of other animals; *Pulex cheopis*, the common rat-flea in India, which, according to Captain Liston, appears to have a preference for *Mus rattus*; *Ceratophyllus fasciatus*, common on rats in all parts of the world, and showing, according to Liston, a preference for *Mus decumanus*; and *Ctenopsylla musculi*, normally harbouring on the mouse. In distinguishing between the above, the following points need alone be noticed:—

(1) The presence or absence of eyes. These organs are very rudimentary in all fleas, the compound eyes of the majority of insects being absent in the entire suborder. In *Pulex*, and allied genera, simple eyes allied to those of the young nematocerous larva occupy the position of the usual faceted eyes, but they are always small, and can hardly be capable of anything more than the bare appreciation of light. It is sometimes rather difficult to determine whether a species be blind or otherwise, as a pigmentary mark sometimes occupies the position of the eye, and may, of course, even really represent it, as the eye in its most rudimentary form is nothing more than a patch of pigment. *Ctenopsylla musculi*, the only blind species on our list, is, however, fairly obviously eyeless, and so can easily be distinguished from the rest.

The second point requiring particular notice is the presence or absence of serrated edges to certain sclerites, notably the inferior border of those forming the sides of the head, and the posterior border of the tergum of the prothorax. In this latter position they have the appearance of a spiked collar. Mr. Rothschild has recently described a flea possessing a mesothoracic collar of this sort, but this need not concern us here. Lastly, the posterior borders of some of the abdominal terga may show a tendency to this form of armament, the anterior segments of one of our species, *Ctenopsylla musculi*, possessing from one to three teeth on either side, but these are not easily made out in specimens mounted in balsam.

Fleas of the same species vary so widely in size that this character is practically valueless for purposes of identification.

These points being duly noted, our five species may be tabulated as below:—

I.—Species possessing obvious eyes.

- (a) With both the inferior border of the head and the hind border of the prothorax serrated.
 - (1) *Pulex felis*.—Eight serrations to lower border of head, the hindmost much smaller than the rest. Prothorax with eight serrations on either side. Tarsal claws of moderate size, but stout.
- (b) Lower border of head unarmed but prothorax serrated.
 - (2) *Ceratophyllus fasciatus*. — Prothoracic collar with ten serrations on either side. Tarsal claws small and delicate. The profile of the head curves down much more sharply to the vertical than in preceding or following species.
- (c) Species with neither inferior border of the head nor the prothorax serrated.
 - (3) *Pulex cheopis*.—Tarsal claws short and delicate, antipygideal bristles long.
 - (4) *Pulex irritans*.—Tarsal claws long and scythe-like, antipygideal bristles short.

II.—Blind species.

- (a) With the inferior border of the head and the prothorax alike serrated.
 - (5) *Ctenopsylla musculi*.—Inferior border of head with 4, and posterior border of prothorax with 11 serrations. Tarsal claws small and delicate. Profile of head sloping markedly backward, after it turns downward, producing an outline like that of the head of "Ally Sloper" of the comic papers.

We could have wished to complete the list with representations of the fleas harboured by monkeys, the familiar Indian verandah squirrel, and the Himalayan marmot, all of which animals are probably occasionally concerned in the spread of plague, but material is lacking. Perhaps some of our readers can supply us with the desired specimens, which should be sent, preferably, preserved in spirit.

Pulex cheopis is believed by Mr. Rothschild to be essentially peculiar to the hotter parts of the globe, but it is certain that it can maintain itself in temperate climates, as a specimen was taken by the writer on a rat caught in Plymouth. As a great naval arsenal, and considerable seaport, the town is in constant communication with all parts of the world, so that it is easy to understand its reaching there on a rat imported by some ship. The fact, however (which has already been published in an entomological periodical), is extremely significant of the dangers to which seaports are exposed.

G. M. G.

R. KOCH ON TUBERCULOSIS.

In the Nobel Lecture, published in the *Lancet*, May 26th, 1906, Professor R. Koch drew attention to the infectious nature of tubercle, and to the necessity for notification of the disease. He stated that Bovine tuberculosis and human tuberculosis are different from one another, and in connection with the combating of tuberculosis it is only the tubercle bacilli emanating from human beings that have to be taken into account.

Of tubercular persons, it is only those who suffer from laryngeal or pulmonary tuberculosis, and whose sputa contain bacilli that are dangerous to those around them in a noteworthy degree. This form of the disease was even called the "open" in contrast to the "closed" form, in which no tubercle bacilli emanate from the body in a dangerous form. In the open form of tuberculosis the patient is dangerous only when he is personally uncleanly, or becomes far advanced and more or less helpless in the disease.

The measures hitherto adopted for the arrest of tuberculosis are: notification, hospitals, sanatoria, and the instruction of the people as to the danger of tuberculosis. Of these the first and last are the most essential. "We must demand notification for tuberculosis" is Professor Koch's view, and all epidemiologists will agree. In a certain way notification is really taking place, as pulmonary phthisis is treated in many hospitals. The benefit of sanatoria is doubtful, and it is only in the early stage of tuberculosis that treatment in a sanatorium is of real use.

"PHILIPPINE JOURNAL OF SCIENCE,"

FEBRUARY, 1906.

INOCULATION AGAINST PLAGUE.

STRONG has inoculated man with attenuated *Bacillus pestis* with promising results. In all, 42 persons have been treated with one twenty-four-hour agar slant culture of the living bacillus, suspended in 1 cc. of 0.85 per cent. saline solution. The material was injected deeply into the deltoid muscle. Strong used a culture of attenuated strength, having obtained two attenuated cultures of the bacillus from Professor Kolle, and made use also of a three-year-old culture, started in Manila, still further reduced in strength, according to Otto's method.

After the injection the patient had slight pains at the seat of inoculation and a febrile state for a day or two, but no serious complications, either locally or constitutionally, resulted.

Of the several sera used as prophylactic or curative agencies in plague, the best known are: (1) Yersin, in 1894, prepared an anti-toxic serum by injecting the bacillus of plague into horses, and killed before use, by heating to a temperature of 136° F. (2) Haffkine, in 1897, used a pure culture of the bacillus in bouillon containing ghee, the bacilli being killed by exposure to a temperature of 158° F. for an hour. (3) Kolle and Otto, in 1902, inoculated guinea-pigs with attenuated living plague bacilli, and showed that these animals can be rendered immune to plague. (4) Strong, as stated above, has now adopted Kolle and Otto's method for human beings; the only special warning he gives is that every care must be taken in the preparation and attenuation of the virus.

YELLOW FEVER.

THE members of the French Commission for the study of yellow fever have issued their report. The conclusions are: (1) That the *Stegomyia fasciata* is the agent by which yellow fever is transmitted, thus confirming the observations of Reed, Carroll, Lazear,

and Agramonte. (2) The mosquito can only acquire power of infection by biting yellow fever patients during the first three days of the patient's illness. (3) Twelve days must elapse after the mosquito has imbibed the virus before its bite can infect human beings. (4) The infected mosquito retains its power of infecting man as long as it lives, namely, twenty to thirty days. (5) The *S. fasciata* requires human blood for the development of her eggs. (6) The first generation of the offspring of an infected mosquito seems capable of transmitting yellow fever fourteen days after reaching full development.

The micro-organism of yellow fever has not been isolated, but the following observations were made: (1) The organism does not exist in human blood after the fourth day of yellow fever. (2) It passes through the Chamberland filter F., but is retained by filter B. (3) The organism is destroyed by exposure to a temperature of 131° F. for five minutes. (4) The blood serum loses power of infection after exposure for forty-eight hours to air. (5) When defibrinated blood is protected from the air the serum retains its potency after five days but not after eight. (6) When dead infected *S. fasciata* are injected by non-infected *S. fasciata* infection results; but this infection only holds good for the first feeding.

As regards immunity, the members of the Commission conclude that: (1) An attack of yellow fever yields immunity usually permanent in this character; should a second attack occur it is of a mild type. (2) Serum kept at 131° F. for five minutes confers a relative immunity when injected into human beings. (3) The same is claimed for defibrinated blood kept under vaseline from air for eight days. (3) No race is naturally immune, but the mosquito seems attracted by certain skins.

Isolation of the patient and destruction of the *Stegomyia fasciata* seem to be the chief points indicated in warding off the spread of yellow fever.

The members of the Commission favour the idea that the micro-organism is of the nature of a spirillum.

EXPERIMENTAL MYIASIS IN GOATS, WITH A STUDY OF THE LIFE CYCLE OF THE FLY USED IN THE EXPERIMENT AND A LIST OF SOME SIMILAR NOXIOUS DIPTERA.¹ By F. C. Wellman, M.D., Benguela, Angola, West Africa.

ABSTRACT.

Dr. Wellman, in elucidation of this subject, employed a fly pronounced by Mr. E. E. Austen to be a species of *Sarcophaga*, near *regularis*, Wied. The animal experimented upon was a native goat of Angola.

The goat was chloroformed, placed under a mosquito net, and the nostrils of the goat painted with water in which pieces of putrid meat were soaked. Some 70 flies were then liberated beneath the mosquito net. The flies could be seen to settle upon the goat's nostrils. On the second day the goat appeared to be ill, it was killed on the third day, when the posterior nares and the frontal sinuses were found to be extensively

eroded, swarming with maggots, and the air passages covered with a thin, glairy, foul-smelling pus. The experiment was tested by control animals. Dr. Wellman concludes that men and animals might be invaded by the fly in question under certain circumstances. A man sleeping in the open, especially if suffering from ozæna, would be liable to be attacked by the fly; any uncovered wound would also become affected.

A list of Diptera convicted of causing human myiasis is given by Dr. Wellman:—

Clyclorrapha — *Schizophora* — *Muscidae* — *Calyptrata*.
Oestridæ.

Gastrophilus. Horses and man.

Hypoderma. *H. bovis*, man. *H. diana*, deer and man.

Dermatobia. The larvæ of *D. cyaniventris* is the "Ver Macaque" of tropical America, and in man causes painful boils, occasionally attacking the eyes; also *Hypoderma bovis* reported by Scheube.

Sarcophagidæ.

Sarcophaga. *S. carnaria*, *S. magnifica*, and *S. ruficornis* occasionally deposit their larvæ in wounds of man (India). A species of this genus (*S. sp.* near *regularis*) is the fly used in the experiment detailed in this paper.

Sarcophila. Man and animals.

Auchmeromyia. *A. luteola*, in Angola, and another species (*A. depressa*), cause cutaneous myiasis in Natal.

Ochromyia. The larva of *O. anthropophaga* is the "Ver du Cayor," which in Senegal produces cutaneous inflammation and swelling.

Muscidae.

Musca. Larvæ of *Musca* sps. occasionally are passed in fæces or found in wounds.

Calliphora. In intestines of man and animals.

Comptosomyia. The larva of *C. macellaria* is the "Screw-worm" of tropical America.

Lucilia. *L. sericata* is the cause of "maggot" in sheep. The larvæ of several species of *Lucilia* have been detected in wounds and ulcers in man and animals.

Anthomyidæ.

Anthomyia. The larvæ of *A. canicularis* not seldom get into the stomach and intestines of man, through eating raw vegetables.

Hydrotæa. In the fæces of human beings.

Homalomyia. In the intestines of man, being passed alive in the fæces. Osler gives a case of infection by *H. scalaris* in Louisiana.

Hylemyia. In human excreta.

Correspondence.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

"ZAMBESI ULCER."

(Letter from Dr. F. C. Wellman.)

SIRS,—May I be permitted to remark in your columns on the criticism of the article by Mr. L. E. Ashley-Emile with the above title (this Journal, September 15th, 1905), which

¹ A paper sent to the American Society of Tropical Medicine.

Mr. J. E. S. Old offers in your February 15th, 1906, number?

While I am not acquainted with the exact region described by Mr. Ashley-Emile, yet I have had some experience with skin diseases in the same latitude—from the Portuguese west coast to the head-waters of the Zambesi—and have often seen the common ulcers described by him (*vide* my "Notes from Angola," Note xviii., this Journal for December 1st, 1905, p. 344). I have also seen a number of cases of cutaneous myiasis, and am not inclined to regard the occasional presence of dipterous larvæ in ulcers in the light of an etiological "discovery." As for the impression conveyed by the author's paper, *i.e.*, that "Zambesi ulcers" are always connected in the first instance with the presence of muscid larvæ in the skin, such an opinion is not confirmed by my observations west of his district, where all ulcers, especially early ones, were closely scanned for Guinea-worms. On the other hand, I should say that the presence of the larvæ was exceptional.

I believe the author is right, however, in stating that the usual larva seen under the skin in this part of the world is distinct from *Benigalia depressa* (which, however, is also seen, but more rarely), for my specimens taken in the interior of Angola in nearly the same latitude, are certainly not to be identified with that species. Neither are they, on the other hand, to be confounded with the muscid larvæ, Blanchard's description of which is quoted in the article under discussion. Regarding this point, Dr. L. O. Howard, Chief of the Bureau of Entomology at Washington, writes (May 10th, 1905) to the Secretary of the American Society of Tropical Medicine concerning my specimens in the following words: "The larva removed with a pair of forceps from under the skin is most interesting. It appears not to be a Muscid, but its affiliations are with the *Sarcophagidae*, the true flesh-flies; but I know of no record of the occurrence of a larva of this family under the skin of a human being. Still, new things are coming up all the while, and we may have here something absolutely novel." The *Sarcophagidae* are important pests in this region, and I have seen the viviparous females depositing their larvæ in wounds. I have also recently produced experimental destructive myiasis in goats, using *Sarcophaga africa*, Wied. and *S. albofasciata*, Macq. (*vide* the *Journal of Medical Research*, vol. xiv., No. 2, January, 1906, p. 439). It would seem probable that Mr. Ashley-Emile is dealing with some such fly as the above, or possibly with *Muscidae*, as he believes. In any event, his finding of the larvæ, presumably in a number of ulcers, on the Zambesi (he, unfortunately, gives no figures) is an interesting observation, in spite of the unscientific and pompous manner in which it is announced, and, although he is unjustified in including without evidence (and without reference to the work of Harman, Ogston, and others, *cf.*, also my memorandum in this Journal for April 15th, 1905, p. 118), the veldt sore of other places in his category of maggot-caused phagedæna, yet it is to be hoped that fly larvæ will now be carefully looked for in all cases of African ulcer.

While waiting for confirmatory evidence, however, since in my own contiguous district cutaneous myiasis is not uncommon, while the formation of ulcers around the larvæ is, to say the least, very rare, and as I have seen no other evidence, in the course of considerable study of such conditions, to justify one in predicting a causal relation between the two conditions, I am unable to accept Mr. Ashley-Emile's etiological theories regarding veldt sore as established even for Zambesia, and agree with Mr. Old in suggesting that he should go over his work again, giving us case records, statistics, and what other exact data he has by him, instead of hasty generalisations and self-congratulatory phrases.

Hoping that you will pardon my occupying so much of your valuable space. Yours, &c.,

South Angola.

April 15th, 1906.

F. CREIGHTON WELLMAN.

Report.

SHANGHAI HEALTH DEPARTMENT.

ANNUAL REPORT FOR 1905.

ARTHUR STANLEY, M.D., B.S.Lond., in his annual report, just issued, on the health of Shanghai, states that "the past year has been the healthiest on record."

The death-rate amongst the 11,497 Europeans resident in Shanghai amounted to 11.2, as against 12.9 in 1904. Amongst a Chinese population of 452,716 the death-rate during 1905 was 14.2, compared with 19.2 during 1904.

Small-pox has been much less prevalent than for some time past; amongst Europeans, 41 cases were notified and 14 deaths registered; amongst Chinese, 246 deaths, as against 759 in 1904.

Cholera was unknown in Shanghai during 1905.

Typhoid fever attacked 50 Europeans, of whom 7 died. Dr. Stanley is of opinion that *Malta fever* occurs in Shanghai, in fact, in a recent letter to this Journal he substantiated the fact, and believes that several cases regarded as typhoid were really *Malta fever* infection.

Diphtheria.—Two deaths only occurred from diphtheria amongst Europeans although 22 persons were attacked. The reason for this low death-rate is no doubt due to the more general use of antitoxin, which is now produced in the Shanghai Health Laboratory.

Scarlet fever, a rare disease anywhere in Asia, except in Asia Minor, seems to have come to Shanghai to stay. Five cases were notified in 1905, in one of which the disease proved fatal.

Tuberculosis heads the list of fatal diseases, both among foreigners and natives, due to a great extent, no doubt, to overcrowding.

Plague cases were not met with in Shanghai during 1905.

Malaria of the benign tertian type occurred in Shanghai, but no deaths from the disease were reported. *Anopheles sinensis* is the variety of mosquito prevalent.

Dengue reached Shanghai in September of 1905, but the cases were neither numerous nor serious.

Beri-beri attacked 7 persons only, of whom 4 died. The municipal gaol was practically free from the disease during the year in question.

Dysentery caused but one death; there were three liver abscesses amongst Europeans.

The work at the Public Health Laboratory is evidently highly efficient, and the Health Department must be congratulated upon the extent and thoroughness of the work of sanitation which is rapidly bringing Shanghai to the forefront as a healthy place of residence for Europeans and for Chinese.

Reviews.

THE MEDICAL DISEASES OF EGYPT. By F. M. Sandwith, M.D., F.R.C.P. Part I. London: Henry Kimpton, 13, Farnival Street, Holborn, E.C., 1905. Pp. 316.

Dr. Sandwith has given us a book of a kind which is rare nowadays. It is written in a manner which

goes far to refute the accusation we are wont to hear frequently repeated, that medical literature in recent times has disassociated itself from all attempts at literary style. The whole book is interesting, and the matter is clothed in a manner at once fascinating and educative.

The opening chapter on "The Medical History in Egypt" shows a wealth of research and knowledge of which it is well known Dr. Sandwith is master. The chapter on Typhus reminds us that this disease still prevails in countries less favoured hygienically than our own. Where extreme poverty and ignorance of public hygiene obtain, there will typhus flourish, and until these are overcome typhus will continue.

Relapsing fever is traced historically, and at the present time when spirillar parasites are being discovered to be the cause of many ailments, it is well to have a description of its typical signs and symptoms.

Dr. Sandwith is of opinion that Egyptian town dwellers now suffer more from enteric fever than they did fifteen or twenty years ago. This is an experience in accordance with that of medical men in most tropical and sub-tropical countries. Whether this is due to more careful diagnosis, to Europeans carrying infection thither, or to an immunity acquired by natives in early years of life through having had the disease, is a matter of opinion at the present time.

Mediterranean Fever was not recognised in Egypt until 1883, when Dr. Sandwith recorded a case of the disease. Since then Mediterranean fever has been met with both amongst Europeans and natives.

Infectious Jaundice (Weil's disease) occurs as a rule only amongst the poorer classes of the community, but during epidemics of the disease any and every class are attacked. Dr. Sandwith is of opinion that the disease is carried by mosquitoes or other insects.

Scarlet fever is occasionally met with in Egypt, and measles is fairly prevalent.

Small-pox has committed fearful ravages in the Sudan during recent years, and in Lower Egypt during 1903 there were 2,118 cases reported, with 394 deaths from the disease.

Egypt is not free from an occasional outbreak of mumps.

Plague.—No mention of plague is contained in Egyptian papyri, but from the time of the third century B.C., the disease would appear to have recurred in Egypt at intervals, up to the present day.

Bilharziosis specially appertains to Egypt, for it was Dr. Bilharz, at Kasr-el-Ainy Hospital in Cairo, who first discovered the connection between hæmaturia and the Bilharzia parasite. The association between urinary calculi and this parasite, also first determined in Egypt, has revolutionised our idea of the pathology of these calculi.

A full description of Anchylostomiasis is welcome; and here, again, we have to thank an observer in Egypt, Dr. Looss, for his careful work on the subject, and for his brilliant observations on the mode of entrance of the larvæ of Anchylostoma by way of the skin.

The chapter on Pellagra closes the first volume, which is characterised by an accuracy of statement, a clearness of diction, and a knowledge of medical history as rare as it is pleasant to meet with.

THE BRITISH GUIANA MEDICAL ANNUAL FOR 1905.
Edited by C. P. Kennard, M.D. Edin., M.R.C.S. Eng. Price 5s. Printed by "The Argosy" Company, Limited, Demerara.

We welcome this admirable medical annual, and congratulate the Editor and contributors upon the excellence of their volume.

CONTENTS.

(1) "Anchylostomiasis." By the Hon. J. E. Godfrey, M.B., C.M. Edin., Surgeon-General.

(2) "Preliminary Notes on the Mosquitoes of British Guiana." By the Rev. J. Aiken, M.A., and E. D. Rowland, M.B., C.M. Edin.

(3) "Report on Small-pox." By J. Teixeira, L.R.C.P. & S. Edin., L.F.P. & S. Glas.

(4) "Acute Anæmia." By C. P. Kennard, M.D. Edin., M.R.C.S. Eng.

(5) "The Criminal Insane and the Insane Criminal." By P. M. Earle, L.R.C.P. & S. Edin.

(6) "On Cataract Disease in British Guiana." By A. Wylie, M.A., M.B., B.C. Cantab., M.R.C.S., L.R.C.P. Lond.

(7) "The Value of Beta Naphthol in Treatment of Anchylostomiasis." By Q. B. De Freitas, M.R.C.S. Eng., L.R.C.P. Lond.

(8) "Typhoid Fever." By C. P. Kennard, M.D. Edin., M.R.C.S. Eng.

(9) "The Climate of Peter's Hall District and its Effects on the Inhabitants." By J. E. Ferguson, M.B., C.M. Edin.

PART II.—Clinical Notes. By Drs. Douglas, Wylie, De Freitas, Earle, Boase, Teixeira, and Kennard.

PART III.—Transactions of the British Guiana Branch of the Medical Association for 1904 and 1905.

Anchylostomiasis.

The measures by which the disease can be stamped out are stated by Dr Godfrey to be:—

- (a) The diagnosis of every case.
- (b) The treatment of every case.
- (c) The destruction of fæces of persons known to be infected.
- (d) The prevention of contamination of the land round and about the labourers' residences, and the fields in which they work.
- (e) The prevention of contamination of the drinking water.
- (f) The distribution of leaflets containing a simple narrative of the disease.
- (g) Making it an offence for any person to defæcate on any part of the land except those portions set apart for the purpose.

Dr. Aiken, in his article, enumerates the British Guiana mosquitoes (from Theobald) as follows:—

Myzomia lutzii; *Stethomyia nimba*; *Cellia argyrotarsis*, sub-species, *C. albipes*; *Megarhinus hæmorrhoidalis*, *M. separatus*; *Janthinosoma musica*, *J. lutzii*; *Stegomyia fasciata*, *S. luciensis*; *Culex teniorhynchus*, *C. serratus*, *C. confirmatus*, *C. nubilis*, *C. scholasticus*, *C. flavipes*, *C. fatigans*, *C. serratus*; *Melanaconion atratus* vel *Culex atratus*; *Teniorhynchus fulvus* or *Culex fulvus*, *T. confinnis*, *T. fasciolatus*;

Mansonia titillans; *Dinocerites cancer*; *Uranotaenia pulcherrima*; *Aedomyia squammipenna*; *Hemagogus cyaneus*, *H. albomaculatus*; *Dendromyia ulocoma*, *D. asullepta*, *D. (quasi) luteoventralis*; *Runcomyia frontosa*; *Sabethes remipes*; *Sabethoides confusus*; *Goeldia fluvialis*.

PHTHISIS IN THE CITY OF CALCUTTA DURING THE YEAR 1905. T. Frederick Pearce, M.D., F.R.C.S.

By a more careful notification of the causes of death in Calcutta, Dr. Pearce has been enabled to come to more definite conclusions concerning the prevalence of phthisis in that city than has been hitherto possible. A paragraph from the report places the result of the investigation strikingly before us. "Perhaps the most striking feature shown by our investigations is the excessive prevalence of phthisis amongst females. Among males the death-rate was only 1.4 per 1,000, which is almost as low as the general rate for England (viz., 1.3 per 1,000), whilst amongst females the rate was more than double, viz., 2.86 per 1,000. Equally noticeable is the extreme prevalence of the disease amongst Mahomedan females, the rate for whom works out at no less than 4.6 per 1,000. In England the death-rate is higher among males than among females. Mahomedan males had an only slightly higher rate than Hindus. The high death-rate from phthisis in Calcutta is entirely due to the fatality of the disease amongst females. Mahomedans of both sexes, however, suffer more than Hindus."

New Instruments, &c.

MESSRS. MAYER AND MELTZER, 71, Great Portland Street, London, W., have sent us their catalogue of instruments used in the practice of laryngology, rhinology, and otology. The catalogue is a very complete one, and shows the careful attention Messrs. Mayer and Meltzer have paid to this branch of surgical appliances. Accompanying the catalogue is a handsome extract from "hospital work in London," with illustrations showing the work rooms of the firm and their general hospital fittings.

Notes and News.

RATS AND PLAGUE.—At a meeting of the Lahore Plague Managing Committee it was resolved that an epitomised copy in pamphlet form of the article in the *Civil and Military Gazette* of March 24th regarding the transmission of plague by the rat-flea be printed and distributed through the medium of the various plague sub-committees.

WE are glad to know that the proposed South African Medical Association is likely to prove a success.

LIEUTENANT-COLONEL GILES asks us to inform his correspondents who may be sending him entomological material, that his address has been changed to 3, Elliott Terrace, The Hoe, Plymouth.

Personal Notes.

India Office: Arrivals in London of Indian Medical Officers.—Major J. Chaytor White, Captain W. H. Henrich, Major R. G. Turner, Lieutenant-Colonel O. H. Channer, Captain G. O. T. Groube, Lieutenant-Colonel C. J. Parkies, Captain J. D. Graham.

Promotions:

The following Promotions are made in the Indian Medical Service.—Majors P. Hehir, L. J. Pisani, W. R. Edwards, C. MacTaggart, G. I. H. Bell, I. Paly, H. Fookes, E. Hudson, A. W. Dawson, and W. H. Robson to be Lieutenant-Colonels; and Captains G. Lamb, H. Burden, C. H. Bowle-Evans, I. Fisher, E. S. Peek, S. A. Harris, E. C. Macleod, C. Thomson, D. W. Sutherland, and W. Selby, to be Majors.

Leave.

Major G. T. Birdwood, 2 m. 12 d.
Major W. D. Sutherland, 15 m. combined leave.

Postings.

Captain H. G. Walton, from Sitapur to Agra.
Captain J. Stephenson to be Civil Surgeon, Shahpur.
Captain D. H. F. Cowen to be Civil Surgeon, Murree.
Captain L. B. Scott officiates as Civil Surgeon, Cachar.
Captain P. F. Chapman, from Civil Surgeon Chihindwara to Akola.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Philippines.

Cholera.—Manila has been free from cholera since February 21st. During the present outbreak, which commenced on August 23rd, 1905, there have been 282 cases of cholera with 250 deaths from the disease in the city of Manila. In the provinces there were 3,742 cases of cholera reported, with 2,807 deaths.

Leprosy.—Two cases of leprosy, which were treated with the X-rays, and in which the symptoms disappeared for a considerable time, have proved disappointing, a relapse having occurred in both cases.

Small-pox.—The provinces of the Philippines, in which vaccination was thoroughly carried out, have remained almost free of small-pox, but in unvaccinated districts the disease has prevailed extensively lately.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

TSETSE-FLIES AND TRYPANOSOMES.

Minchin, Prof. E. A., who, it may be remembered, was deputed to Uganda by the Royal Society to study the relations between *Trypanosoma gambiense* and *Glossina palpalis*, gives, in his pamphlet of eight pages, the results he has obtained at Entebbe, in association with Lieutenants Gray and Tulloch, R.A.M.C. Previously to his joining them, these two officers believed they had discovered evolutionary forms of the *T. gambiense* in the flies.

Minchin's results are, however, somewhat disappointing, as he believes the forms they observed have no connection with the trypanosome.

Some 8 per cent. of the tsetse-flies found in the small island of Kimmri were infected with these supposed evolutionary forms, two distinct species, one resembling the trypanosomes of birds and the other that of mammals, being distinguishable; but no corresponding vertebrate host could be discovered, and inoculation of animals capable of harbouring *T. gambiense* gave negative results. On this account it appears more probable that these forms, which are of the *Herpetomonas* type, are really special parasites of the tsetse-flies, like the herpetomonads of ordinary flies which do not suck blood.

Some were also found in a *Glossina* born in the laboratory, and which had been fed only on the blood of a domestic fowl, so that it seems probable that these herpetomonads can be transmitted by hereditary infection.

Attempts to infect flies by causing them to bite infected animals gave doubtful results. Changes resulting in the differentiation of what seemed to be male and female types went on for forty-eight hours, but then the process came to an abrupt halt, and by the end of seventy-two hours few or no trypanosomes remained in the stomach or demonstrable by dissection, though it is possible that sectioning may yield different results. We are therefore still without any proof of the existence of any developmental cycle within the tsetse at all comparable with that of the malarial parasite in the mosquito. If any such cycle take place, it is presumable that the infection of the fly would require a certain interval for development after feeding with infected blood, but no such periodicity can be shown to exist. The *Glossina* can, however, undoubtedly act as a simple vehicle. Thus experimenting with rats seriously infected with a trypanosome (probably *T. Brucei*) by causing flies fed on them to bite healthy animals, four successes were obtained out of five experiments, while using *Stomoxys* only one success in four resulted. It is further noteworthy that while the trypanosomes survive seventy-two hours in *Glossina*, they persist but twenty-four hours in *Stomoxys*.

Prof. Minchin therefore inclines to the belief that the tsetse acts simply as a vehicle, and points out that if it really played the part of an intermediate host, the spread of the disease in human beings would probably be far more rapid than it is.

"Zeits. f. Hygiene," T. lli., p. 31, with 2 plates.

THE PATHOLOGICAL HISTOLOGY OF EXPERIMENTAL NAGANA.

Sauerbeck, Ernst. The author compares the pathological histology of trypanosomiasis with that of tropical splenomegaly from the *Piroplasma Donovanii*. He examined the organs of rats, guinea-pigs, rabbits and dogs infected with *Trypanosoma Brucei*, but found nothing to add to the results of previous investigators. In the blood no degenerative processes are normally observable in the trypanosomes, but such are commonly to be found in the internal organs, notably in the spleen, lymph glands, bone-marrow, and liver, and less markedly so in the lungs.

The author regards the amœboid and other forms described by Plimmer and Bradford, and which they considered as stages in a complicated system of evolution of the parasite, as merely of the degenerative character, and further points out their close resemblance to the Leishman-Donovan bodies. Prof. Mesnil, commenting on the paper in the *Bulletin of the Pasteur Institute*, however, points out that though the resemblance between the two forms is undeniable, it cannot warrant our regarding tropical splenomegaly and trypanosomiasis as belonging to the same category of disease. The Leishman-Donovan bodies are a normal and definitive form for the human organism, and, despite the fact that cultivations of the *P. Donovanii* give rise to flagellate forms, never include any trace of flagellate forms *in vivo*. The smaller bodies found in try-

panosomiasis, on the other hand, are no part of the evolution of the parasites, but are merely stages of their degeneration, which rapidly disintegrate, while the Leishman-Donovan bodies maintain a perfect integrity. The involution forms of the trypanosomes are usually intracellular, and in course of digestion by phagocytes and Sauerbeck's own descriptions clearly show that the histological changes in the organs are due to proliferation of the latter, but he nevertheless insists on the complete resemblance between these histological elements and those found in tropical splenomegaly.

The phagocytic action of the mononuclear cells can be demonstrated by making an intraperitoneal injection of trypanosomes. The macrophages engulf the perfectly mobile parasites, which take a rounded form in their interior, and the same process evidently occurs in phagocytic organs, which behave in this case exactly as they do in malignant carbuncle, typhoid fever, or plague.

"Atti della Società per gli Studi della Malaria," T.vi., Rome, 1905, 666 pages.

The volume is made up of the reports for 1904 of a number of writers who for the most part concern themselves with the results of preventive measures for malaria.

On the railways protection by metallic gauze for employees continues to be favourably reported upon, but it is pointed out by V. Polettina that for private individuals the expense is prohibitive, except in the case of the well-to-do. This contributor also considers that the dangers of rice cultivation are exaggerated, but it is obvious that this opinion may be based on local peculiarities of the district under his observation.

A large portion of the volume is occupied with reports on the results of the prophylactic administration of quinine, and the opinions of the various writers appear to be uniformly favourable. In many cases the sickness among the unprotected was three times as great as among those taking quinine, and in view of the large numbers treated, many of whom must have occasionally forgotten to take their dose, this must be considered highly satisfactory.

The annual cost per head, according to G. Soliani, is about 2.20 lire, or 1s. 10d.

The year's results are summed up by Prof. Celli in an able article. Judged by effects on the general population, the year 1904 was a bad one. In the north, benign tertian predominated, but in the south the Roman Campagna malignant tertian was commonest. Cases of quartan fever were irregularly distributed. In an epidemic, cases of relapse are always more numerous than those of primary infection. In the Roman hospitals cases of relapse were very common in July and August, and diminished suddenly in September, whereas usually relapses are most common in September and October. Primary infections were most numerous in July and August.

Although many contributors witness to the efficacy of Koch's method of large doses every eight or nine days, Prof. Celli appears to give his verdict in favour of the daily administration of moderate doses of 6 or 8 grains.

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

A FURTHER REPORT ON MEASURES TAKEN
IN 1901 TO ABOLISH MALARIA FROM
KLANG AND PORT SWETTENHAM IN
SELANGOR, FEDERATED MALAY STATES.

By E. A. O. TRAVERS, M.R.C.S., L.R.C.P.,
State Surgeon, Selangor, and
MALCOLM WATSON, M.D., D.P.H.,
District Surgeon, Klang.

THE measures taken to abolish malaria from Klang and Port Swettenham in 1901 and 1902 by the extermination of mosquitoes by means of extensive drainage and other operations tending to do away with their breeding grounds, have been fully reported on in the JOURNAL OF TROPICAL MEDICINE of September 15th, November 10th, and December 1st, 1903, and April 1st, 1904.

It is proposed in the present article to show that the expenditure undertaken by Government, with a view to improving the health of the inhabitants of these towns, has been fully justified by the results which the experience of the last four years justifies us in concluding will be of a permanent nature.

For the information of those who have not read the previous articles on this subject, a brief account of the works carried out may be of interest.

Port Swettenham.—An area of about 110 acres, formerly low-lying, swampy land covered with mangrove trees, has been cleared and carefully drained. In the neighbourhood of the railway, Government buildings, and town site, a considerable area has been filled in and levelled, partly to do away with the breeding grounds of mosquitoes and partly to provide building sites. The whole area not occupied by buildings or roads is now covered by grass.

The total expenditure on works other than the preparation of building sites has been (to the end of 1905) £7,000, and the annual cost of upkeep of drains, &c., is approximately £40, for clearing earth drains and for town gardeners, £100.

Klang.—The area affected by the operations is about 332 acres. Twenty-five acres of virgin jungle and 80 acres of dense secondary growth (in places 30 to 40 feet high) have been cleared and 36 acres of permanent swamp have been drained. The areas cleared are now mainly under grass.

The total expenditure to end of 1905 has been £3,100, and the cost of annual upkeep is about £60 for clearing earth drains, and £210 for town gardeners.

As will be seen by the following statistics of cases of malaria treated at the District Hospital, Klang, the improvement in the health of the inhabitants of the areas treated began immediately after the completion of the drainage and other works, and has continued to date.

Table showing the number of cases of malaria admitted to the Klang Hospital from Klang Town and Port Swettenham, as compared to the number of cases admitted from other parts of the district:—

Residence	1901	1902	1903	1904	1905
Klang	334	129	48	28	12
*Klang and Port Swettenham ..	88				
Port Swettenham	188	70	21	4	11
Other parts of District	197	204	150	266	353
Total	807	403	219	298	376

* Certain persons lived some nights in Klang and some in Port Swettenham.

The following table shows the number of deaths from fever and other diseases which have occurred at Klang and Port Swettenham during the last six years. The population in 1901 was about 4,000, but has largely increased since.

Deaths in Klang and Port Swettenham corrected for Deaths in Hospital.

Year	1900	1901	1902	1903	1904	1905
Fever	259	368	59	46	48	45
Other Diseases	215	214	85	69	74	68
Total	474	582	144	115	122	113

It will be noted that the remarkable improvement in the health of the inhabitants which occurred in 1902, immediately after the anti-malarial works had been completed, has been well maintained.

The following table shows the number of deaths occurring in the district of Klang, excluding the town of Klang and Port Swettenham. (Population 14,000 in 1901, since largely increased.)

Deaths in Klang District, excluding Klang Town and Port Swettenham.

Year	1900	1901	1902	1903	1904	1905
Fever	173	266	227	290	286	351
Other Diseases	133	150	176	198	204	271
Total	306	416	403	428	490	612

These figures are especially valuable as a proof that the marked improvement in the health of the inhabitants of the town of Klang and Port Swettenham is due to the anti-malarial measures carried out, and not to a general improvement in the health of the district.

In Klang and Port Swettenham we have 368 deaths due to fever in 1901, and 45 only in 1905; whereas in the rest of the district, which has not been dealt with by any special anti-malarial works, we have 266 deaths due to fever in 1901, and 351 in 1905.

It may here be mentioned that Klang is a large planting district about 380 square miles in extent, that it is mainly low-lying flat land utilised for the cultivation of rubber, and that it would be almost impossible to protect the scattered population from malaria by

drainage and filling in swamps. A great deal is now being done on most of the estates by regular administration of quinine, and also by protection from mosquitoes.

Malaria in children as evidenced by Examination of blood.—No better indication of the presence or absence of malaria in any given district can be obtained than by a systematic examination of the blood of children.

The following details of the results of examinations carried out by Dr. Watson in 1904 and 1905 are of considerable interest:—

Results of Examination of Blood of Children in Klang and Port Swettenham (specially Drained Areas).

	NOV. AND DEC., 1904			NOV. AND DEC., 1905		
	No. Examined	Infected	Percentage Infected	No. Examined	Infected	Percentage Infected
Klang	173	1	0.57	119	1	0.84
Port Swettenham ..	87	1	1.14	76	0	0.00
Total	260	2	0.76	195	1	0.51

Results of Blood Examinations in other Parts of District not especially Drained.

NOV. AND DEC., 1904			NOV. AND DEC., 1905		
No. Examined	Infected	Percentage Infected	No. Examined	Infected	Percentage Infected
298	101	33.89	247	59	23.8

Improvement in Health of Government Employees.—The remarkable way in which the health of the Government employees residing at Klang and Port Swettenham has been affected is well shown by the following figures. It may be mentioned that in 1901 the number of persons residing at Port Swettenham, employed by Government, was 176, and in 1904, 281.

Table showing Number of Sick Certificates and Number of Days' Leave Granted on account of Malaria.

	1901	1902	1903	1904	1905
Certificates	236	40	23	14	4
Days of Leave	1,026	198	73	71	30

The conclusions to be arrived at from the figures given in this report are very evident:—

(1) Measures taken systematically to destroy the breeding place of mosquitoes in the towns, the inhabitants of which suffered terribly from malaria, were followed almost immediately by a general improvement in health and decrease in death-rate.

(2) That this was due directly to the works carried

out, and not to a general dying out of malaria in the district, is clearly shown by figures pointing out that while malaria has practically ceased to exist in the areas treated, it has actually increased to a considerable extent in other parts of the district where anti-malarial measures have not been undertaken.

The fact that the statistics for 1905 are even more favourable than those for 1902 is very strong evidence in favour of the permanent nature of the improvement carried out.

If, as it is hoped, malaria has been permanently stamped out from Klang and Port Swettenham by works undertaken in 1901, our experience in the Malay States should be of value to those responsible for the health of communities similarly situated in many other parts of the world.

THE ANATOMY OF THE BITING FLIES OF THE GENERA *STOMOXYS* AND *GLOSSINA*.

By Lieut.-Colonel G. M. GILES, I.M.S. (Rtd.).

(Continued from p. 185.)

THE abdomen is a good deal shorter than the wings, and, seen from above, appears to be composed of only four segments, the juncture between the first two being hidden and the remaining four concealed by being curled under in the male or hidden in the telescoped ovipositor of the female. In the gorged insect, the whole of the ventro-anterior portion of the cavity is taken up with the enormous crop, which in males, when distended, occupies almost the entire space, leaving the other viscera crowded into a comparatively small space behind and above it. When empty of food it contains a certain amount of air, and Lieut. Tulloch's account, transcribed below, must be taken as referring to it in this condition: As his admirable account, which entirely agrees with my own observations, is very brief and to the purpose, I cannot do better than transcribe it, altering the nomenclature, where necessary, to that hitherto employed. He says:—

"The midgut runs down into the abdomen of the fly as a narrow tube of uniform diameter until it reaches nearly to the posterior border of the crop. At this point it dilates to several times its former diameter, its wall at the same time becoming thinner. It is proportionately shorter, less coiled, and more distensible than in *Glossina*, being about three times as long as the fly itself. This dilated portion has three simple coils, which lie superposed in the middle of the abdomen, and it then gradually narrows, continuing as a uniformly narrow tube down to the rectum. The narrow lower intestine has variable bends, but is not coiled. The rectum is a dilated cone-shaped cavity, with its apex towards the anus. Its walls are transparent, and through them are seen the four trumpet-shaped rectal papillæ, the narrow ends of which are pointed towards the anus, a single trachea entering the base of each. Below the dilatation, the rectum is continued to the anus as a short, narrow tube. In the female the distal part of the rectum runs within the ovipositor, the anus opening between the last segment of the ovipositor and the terminal plate. In the male the ejaculatory duct passes over it dorsally from left to right and runs anteriorly to enter the penis. The appendages of the alimentary canal are the Malpighian tubes, the crop and the salivary glands. The Malpighian tubes arise from a



PLATE I.—1, Epithelium of chyle stomach, $\times 750$; 2, vertical section, upper part of proximal intestine, $\times 750$; 3, vertical section, lower thin part of proximal intestine, $\times 270$; 4, lumen of intestine, $\times 750$; 5, vertical section, upper part of metenteron, $\times 270$; 6, drawing in perspective of rectal papillae as seen in a d ssection of the rectum which is laid open, $\times 37$; 7, vertical section of a rectal papilla, $\times 270$; 8, transverse section of heart of *Stomoxys*, $\times 270$; 9, transverse section of heart of *Glossina*, $\times 270$; 10, semi-diagrammatic representation of valves of heart of *Stomoxys*, $\times 270$; 11, pavement endothelium of pericardial septum, $\times 270$; 12, portion of fat-body, $\times 550$; 13, "pericardial cell" fat-body type, $\times 750$; 14, pericardial cell, Lowne's muscular type, $\times 750$; 15, transverse section, thoracic aorta, $\times 1,500$.

To illustrate article by Lieut.-Col. G. M. GILES, I.M.S., "The Anatomy of the Biting Flies of the Genera *Stomoxys* and *Glossina*."

shallow constriction which marks the point of junction between the midgut and metenteron, and it, together with the true proctodeum, comprises in length about one fifth of the abdominal intestinal canal. Two of the tubules arise on either side from a short, common tube, all four being about the same length. The two arising from one side have thickened terminations, some four times greater than a

(figs. 3 and 4), and has a very distinct limiting membrane towards the lumen of the tube.

The metenteron, on the other hand, is strongly muscular, and is structurally divisible into two distinct portions. For the first and greater part of its length it is lined with a distinct cuticular lining, the epithelial elements of which are scarcely discernible. In the ordinary contracted condition of the tube, this is wrinkled into deep folds, in the interior of which are strong longitudinal muscular bands (pl. i., fig. 5), and outside these is an equally strong coat of circular muscular fibres. The last short portion before the rectal valve is of similar structure, but here (fig. 6) the cuticular lining has become distinctly chitinous, and has developed into a curious armature of powerful spines, the function of which I am unable to conjecture. There is, however, nothing generically peculiar in this structure, which is, I believe, found throughout the Muscidae. The "rectal valve" between this portion of the intestine and the rectum is lined with similar spines, and is surrounded by a muscular thickening. At first the rectum is tubular, and its chitinous lining has a distinct

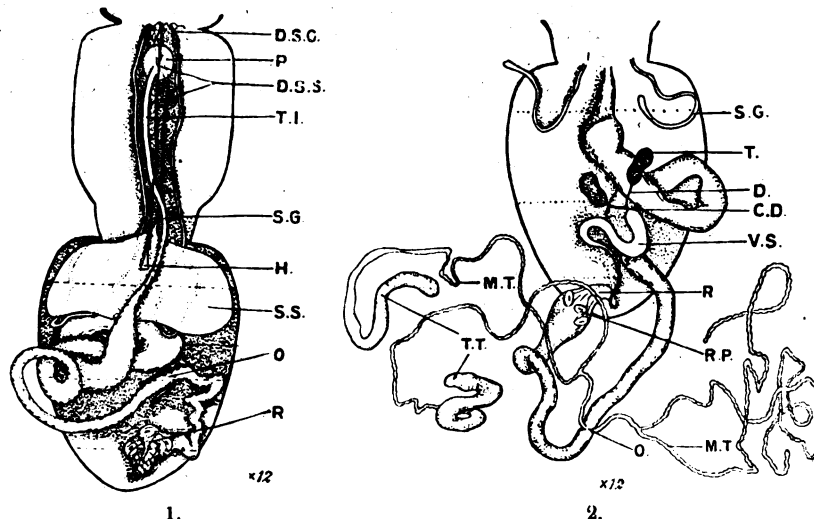


FIG. 29.—Dissections of the abdomen of *Stomoxys*, after Lieut. Tulloch, seen from above:—(1) with the parts almost *in situ*; (2) with the alimentary canal unravelled; *cd*, common seminal duct; *d*, seminal duct; *dsg*, duct of salivary gland; *dss*, crop duct; *h*, dorsal vessel; *mt*, malpighian tubes; *o*, junction of distal intestine and metenteron; *p*, proventriculus; *r*, rectum; *rp*, rectal papillæ; *sg*, salivary glands; *ss*, crop; *ti*, chyle duct; *tt*, dilated ends of left malpighian tubes; *vs*, vesicular seminalis.

salivary gland, and lie in the pericardial sinus; those of the other are of uniform thickness, and end amid the fat body of the lower abdomen. The salivary glands in the abdomen are ventral to the crop, and seen from above only a knuckle of each projects beyond it, and then turned forwards to end close to the waist in slightly bulbous ends. Except for this angular bend the glands are straight, and even if extended, would not reach to the end of the fly.

Throughout its length the mucosa of the intestinal canal is composed of a single layer of epithelial cells. The wide thoracic portion of the midgut of the blow-fly, called by Lowne the chyle stomach, is in *Stomoxys* a quite narrow tube, though it has the same structure as in the former insect. Both it and the wide proximal intestine is composed of a layer of cells whose components vary a good deal in size and form, according to the stage of secretory activity in which they have been fixed. In the thoracic portion the muscular coat is fairly distinct, and both the longitudinal and circular fibres are arranged at intervals, leaving spaces where there is only epithelium; but the pouching out of the lining into these spaces is by no means as marked as in the blow-fly, so that even in proportion to its size this part of the gut has not as strongly granular an appearance when viewed with a dissecting lens. The dilated part of the proximal intestine has an epithelial lining (plate i., fig. 1) of much the same character, and both in it and the narrow transparent part that follows it the muscular coat is very ill marked, and often appears quite absent in sections; though where the transition to the structure of the narrow part occurs, the circular coat becomes very distinct (fig. 2). The narrow part is lined with cubical cells of regular form

basis of cubical epithelial elements; but after passing a quasi-sphincter formed by a thickening of the muscular coat, it expands into a large cavity which lies on the right side just under the interior abdominal terga. This dilated portion of the rectum is lined by a delicate chitinous membrane, the epithelial basis of which is not easily demonstrable, and is covered with a network of muscular fibres closer meshed, but of the same general character as that of the crop. This dilatation contains the four rectal papillæ, which are four cylindrical projections ending in blunt conical points, lying two and two lengthwise in the intestine. They resemble a good deal the rectal gills of certain aquatic larvæ, but according to Lowne subserve the renal function, as he has found in them a substance related to uric acid. Their general form may be seen from the dissection (plate i., fig. 7) of the two right-hand papillæ (the figure being reversed), and in section (plate i., fig. 8) are seen to be formed of very large columnar cells surrounding a core of delicate mesodermic tissue in which is imbedded a large trachea. Behind the papillæ the rectum contracts to a mere slit, and the absolute anus is guarded by a strong sphincter of unstriped muscle.

The malpighian tubes which enter the bowel at the point of junction of the proximal intestine with the metenteron hardly differ from those of the mosquito even in size. Their large pigmented cells and slit-like lumen, zig-zag longitudinally, must be familiar to most students of tropical medicine from their dissections of those insects. Lowne advances strong reasons for believing that

their function is hepatic, and not, as usually supposed, renal.

The crop has an elastic pigmented chitinous membrane covered with an open and rather irregular

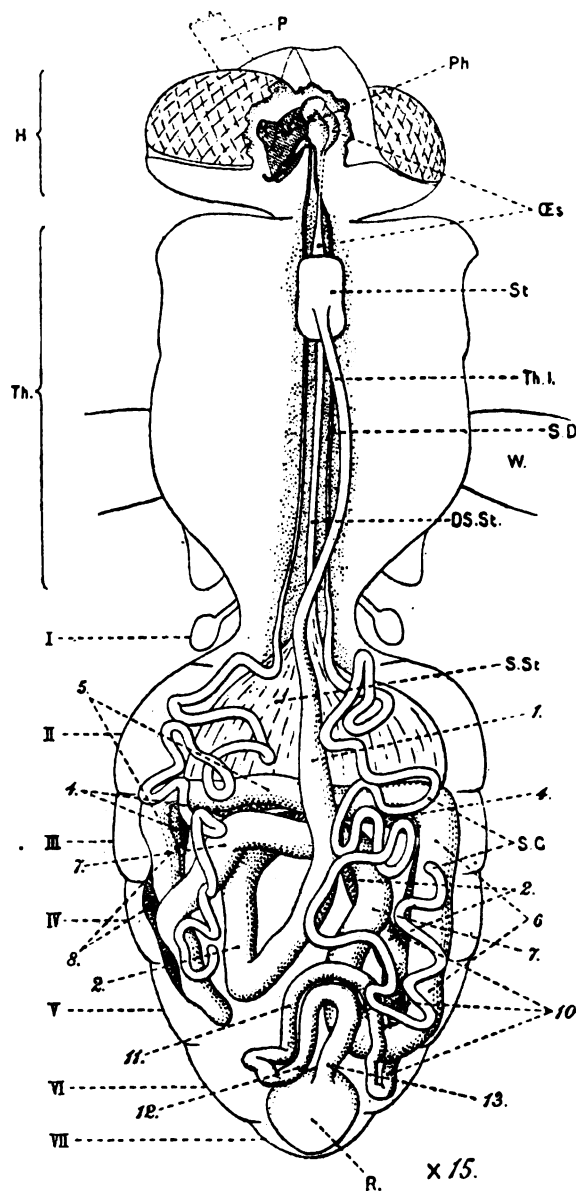


FIG. 30.—General view of the digestive tract of *Glossina palpalis*, as seen in dorsal view without disturbing its parts. The heart and over-lying tracheæ and fat-body are removed in the abdomen, also the muscles in the thorax, and the brain and other parts of the nervous system are omitted from the drawing. The head is shown round to the left, in order to show the pharynx, &c., in three-quarter side view. *Ph*, pharynx; *Es*, esophagus (the portion which passes through the brain being represented with a dotted outline); *St*, stomach; *Th. I*, thoracic intestine, pulled over to the right, in order to show the duct of the crop lying beneath it; *S. D*, salivary duct; *DS. St*, duct of; *S. St*, the sucking stomach; *S. G*, salivary gland (that on the right is drawn from a specimen in which the gland was more developed than in the case of that drawn on the left); 1-13, limbs of the abdominal intestine (see fig. 31); *R*, rectum. (After Minchin.)

network of unstriped muscle, and its ventral side is connected with the abdominal sterna by a number of single obliquely-directed striped muscular fibres. Its whole structure is such that though clearly contractile, it is obviously absolutely incapable of active dilatation, so the name of "sucking stomach," which is sometimes applied to it, should be carefully avoided.

In *Glossina* the abdominal intestine is longer, larger, and in every way more voluminous, and the secretory area of the dilated portion has its surface enormously increased by deep infoldings of very large epithelial

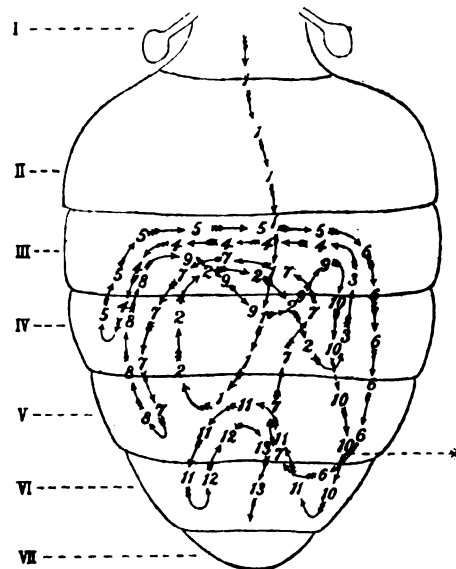


FIG. 31.—Diagram to show the various limbs (1-13) of the abdominal intestine, and their arrangement in the abdomen. The asterisk * denotes the point at which the Malpighian tubules arise in the tenth limb. (After Minchin.)

elements. The two figures herewith reproduced from Professor Minchin's paper will, in the light of what has been said of the allied species, give a sufficient idea of the arrangement of the parts, and as he proposes to write a paper on the histology of the genus, any further discussion of the subject here is superfluous.

The enormous development of the intestine is somewhat surprising in a species subsisting on so nutritious a diet as blood.

The vascular system.—What is found by the writer the readiest plan of demonstrating the dorsal vessel of a dipterous insect is to compress the insect between the fingers and thumb, at the same time, as far as possible, strengthening out the dorsal curve, and then to snip off the mid-dorsal portion of the abdomen by a single stroke of a pair of sharp scissors.

The portion removed is then placed in water, under the dissecting microscope, and as much as possible of the fat body picked away. The facility of this latter operation, however, differs greatly in different species, but is especially difficult in *Stomoxys*. Lieut. Tulloch, in his paper, notices this point. He says:—

"Though several stained preparations were made, it was impossible, owing to the fat body, which obscured all detail, to count the chambers and cells in the heart wall. They seemed, from a comparison of all preparations, to be re-

duced in proportion to the smaller number (four) of abdominal segments possessed by *Stomoxys*."

As compared with *Glossina*, I am inclined to agree with Lieut. Tulloch as to the number of chambers, but must confess great uncertainty on the point.

Referring to *Glossina*, Prof. Minchin writes as follows:—

"The vascular system consists of the heart, in the abdomen, and its continuation, the thoracic aorta, in the thorax.

"The heart occupies the five anterior segments of the abdomen, and is situated dorsally immediately below the plates of the terga. It is so imbedded in the fat body and pericardial tissue that not much can be made out of its structure by dissection alone, and examination of it mounted as a preparation for the microscope is necessary. It can then be seen to have five chambers, each with a pair of ostia and a pair of alary muscles, corresponding to the segments in which it lies. The alary muscles pass out at right angles to the axis of the heart, and can be traced through the fat body to their attachments at the external lateral margins of the tergal plates.

"The hindermost chamber of the heart appears to end blindly posteriorly. A little way in front of the hinder end are attached the two large alary muscles, the largest of the whole series; not far in front of these again are the two ostia, on the sides of the widest part of the chamber. In front of the ostia the lumen of the heart narrows rapidly, and to the narrow portion is attached the next pair of alary muscles, lying in the hinder part of segment 4. This arrangement is continued in segments 2, 3, and 4, the dilated portion of the chamber, with the ostia, occupying the middle of the segment, while the alary muscles, attached to the constrictions between the chambers, lie in the posterior regions of the segments. The alary muscles of these three segments are of moderate size. In segment 2 the heart receives a pair of tracheal tubes, right and left, which come to it opposite the ostia, and fork at once into branches running forwards and backwards. The alary muscles corresponding to the first abdominal segment are very small and difficult to make out, and the region of the heart to which they are attached does not show the slightest diminution or constriction of its lumen, as is the case in all the chambers posterior to it. In front of the first pair of alary muscles, at the usual interval, are the two ostia, quite similar to those of the other chambers. In front of the first pair of ostia the lumen of the heart narrows to form a thin-walled vessel, which passes through the waist to become the artery which I have termed above the thoracic aorta. This last runs along the thoracic intestine on its dorsal side, and is continued over the stomach, remaining apparently quite independent of the digestive tract, and only loosely attached to it, until it reaches the œsophagus. Here it is firmly attached and becomes considerably dilated. A short distance in front of the stomach a conspicuous cushion-like mass of large cells lies over the aorta. At first I took this structure for a ganglion, but it appears to be a sort of lymphatic gland, judging from its appearance in sections. The thoracic aorta is apparently continued through the neck into the head, but I have not been able to follow its course further than the thorax.

"The microscopic examination of the heart shows further that its floor is composed chiefly of fusiform cells resembling unstriated muscle fibres, while its sides are made up of gigantic cells with nuclei of corresponding proportions. These cells are arranged with perfect regularity, and in a manner exactly similar on the two sides of the heart. Each ostium is formed by two cells, which are of small size when compared with the huge cells building up the wall of the heart, but are very large when compared with the cells of the surrounding tissues. Two of the giant cells intervene on each side between the hinder end of the heart and the fifth pair of alary muscles; two more between these muscles and the ostia next in front of them; and so on with unfail-

ing regularity all the length of the heart, each ostium being separated from the alary muscles next in front or behind by just two giant cells. In front of the first pair of ostia are found two cells of the usual size on each side, then a pair of slightly smaller cells, which pass on into the walls of the thoracic aorta. Thus the entire wall of the heart is built up of 23 pairs of giant cells, not counting the ten couples of smaller cells which compose the five pairs of ostia: to wit, four pairs to each of the five chambers, two additional pairs behind the fifth pair of alary muscles, and one pair anteriorly, making the transition to the thoracic aorta. In view of the fact that the thoracic vessel is itself to be considered as a modified anterior portion of the heart, it is interesting to find that its delicate wall contains very large, flattened nuclei, arranged in pairs right and left.

"The alary muscles consist of delicate fibrils, arranged in an irregular fan-like manner, uniting into a stout muscle-fibre which is distinctly striated."

The above description, in the main, applies equally well to *Stomoxys*, and is in entire agreement with such observations as I have made on *Glossina*, except as to the floor of the heart being composed of "fusiform cells resembling unstriated muscular fibres." It is believed that the statement is referable to the appearances presented by dissected specimens, which always include the pericardial septum, which, seen in optical section, certainly conveys the impression described. As the result of the examination of sections, the writer believes that Lowne is correct in describing the dorsal vessel of Diptera as a hollow muscle, composed at the most of two cells in any single transverse section.

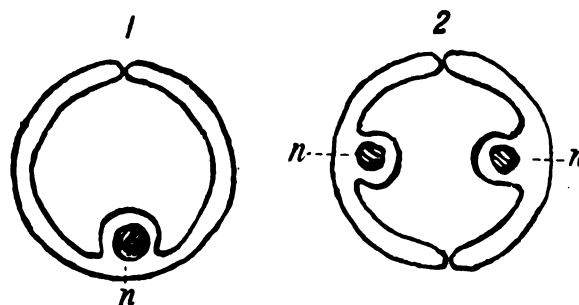


FIG. 32.

Lowne's conception of the heart of the blow-fly, as gathered from his book, may be diagrammatically represented as in fig. 32, each large nucleated cell being provided with lateral expansions which meet above in the middle line. In *Glossina*, however, my sections appear to show that there are always two cells in any individual transverse section; and that, as Professor Minchin states, they are symmetrically disposed in pairs, but I can find no difference in structure in the upper and lower walls, and so doubt the existence of a structurally differentiated floor to the organ.

In *Stomoxys* there are also usually two cells in any individual transverse section, but they are placed not opposite each other, but alternately, so that only one of the oblong nuclei is ever visible in a single section, and opposite the middle of each the entire circumference of the tube is presumably formed by that cell alone. The number of giant cells would therefore be less than in *Glossina*; but, like Lieut. Tulloch, I have been quite unable to count them, and the heart is so

frequently damaged in serial sections of the entire insect that they throw no further light on the point beyond the fact that the nuclei are certainly opposite in *Glossina* and alternate in *Stomoxys*.

Seen in transverse section, the entire wall of the heart has an uniform structure but for the nuclei of its component giant cells. On close examination the protoplasm is seen to be broken up into masses of irregular prismatic section which form the cross view of the longitudinal striation, which is distinctly visible in longitudinal optical section. Plate i., fig. 9, represents a section of the anterior part of the heart of *Stomoxys* (Banded form ♀) in which, on the right side of the figure, one of the nuclei of that side is cut across, while that of the opposite side is divided beyond the nucleus, and so represented only by a slight projection. In pl. i., fig. 10, is shown a similar section of the back part of the heart of *Glossina*, in which the nuclei of the two component cells are divided at about a corresponding level. It is noteworthy that in this insect the cells project much more into the lumen of the tube than in *Stomoxys*, so that at their thickest part they appear connected with the body of the cell by a comparatively narrow pedicle. Fig. 11 is a semi-diagrammatic representation of a valve in *Glossina* as seen in optical section. It will be noticed that it differs somewhat from Prof. Minchin's account of the number of component smaller cells, in that three instead of two are represented as forming the valve, but the appearances presented by a structure seen in this way are notoriously deceptive, and I have no disposition to press the point. In *Stomoxys* I have as yet failed to obtain any satisfactory view of the valves.

(To be continued.)

Correspondence.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

DEAR SIRS,—The following case may be of some interest to younger members of the profession in the tropics. A blacksmith, S., aged 35, from Jerusalem, well-known as one of the strongest men in the place, consulted me three or four months since for abdominal pain. Nothing being much wrong with him I prescribed a purge with santoninum. Next day he came back much pleased with the relief he had experienced, but I could hardly understand why he was so pleased. However, next day his symptoms recurred, it being cold weather and no history of fever and chills being given, the idea of malaria never occurred to me.

Two days later I received an urgent message, and later an offer of double the usual fee if I would go at once to see him. He was doubled up with abdominal pain and had been very sick, but there was nothing in the abdomen to account for it. Finding he had a temperature of 103°, I took a slide of his blood, warning him that if the examination were negative he must go to hospital. The matter was cleared up, greatly to my surprise, by my finding numerous tertian parasites and gametes, and a few doses of quinine soon ended the attack; the spleen was not at all enlarged.

Ramallah, Jerusalem.
June 13th, 1906.

I am, &c.,
J. CROPPER.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—In the course of my work with films from yaws lesions and glands, I have been able to confirm some at

least of the observations of Dr. McLennan (*British Medical Journal*, May 12th, 1906), connecting spir. pallida with cytorrhycles luis.

The enclosed sketches were taken from a smear of serum of a cleaned frambæsia, stained in Giemsa solution. They show in the briefest way the almost certain identity of the organisms found in syphilis and yaws.

The study is a difficult one, especially for a medical officer "fed up" with work, and I have been handicapped by want of higher powers. The London School of Tropical Medicine lent me a 1 $\frac{1}{2}$ inch, but unfortunately they required it again before one had got well into the research.

I am now awaiting new lenses, and hope to be in a position to report progress later.

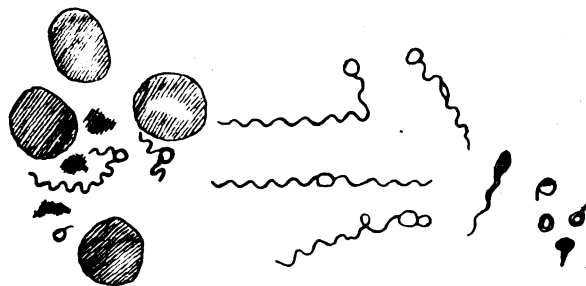


FIG. 1.
A group as actually seen.

FIG. 2.
Some forms occurring on same slide as fig. 1.

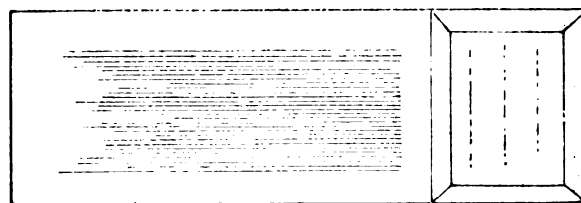
St. Vincent, B.W.I.
May 29th, 1906.

C. W. BRANCH, M.B.

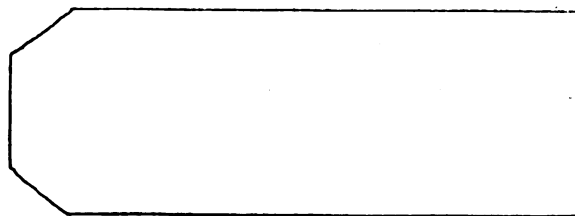
To the Editors of the JOURNAL OF TROPICAL MEDICINE.

DEAR SIRS,—I enclose a slide showing a method of preparing films of blood which I have found very useful in practice. It has the following advantages:—(1) Great simplicity. (2) The film can be made at any distance from the edge of the slide. (3) In an emergency the ear can be cut with the edge of the slide in the absence of knife or needle. An ordinary ground glass slide is clipped by scissors so that one end is narrowed to the desired width of the film, this varying according to the particular mechanical stage in use. The film is made in the ordinary way as described by Daniels, i.e., with the end of the slide.

I am, &c.,
J. CROPPER, M.D.



Film made by slide below.



Slide cut to desired width.

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THE

Journal of Tropical Medicine

JULY 2, 1906.

HYGIENIC MEASURES AGAINST SYPHILIS.**HARBEN LECTURE NO. III.**

PROFESSOR METCHNIKOFF dealt with syphilis and its prophylaxis in manner at once practical and scientific. Syphilis, like tuberculosis and influenza, is directly contagious from man to man, requiring no intermediary host to transmit the infection. At first sight it would seem an easy problem to check the spread of a disease which is conveyed by intelligent human beings by appealing to their intelligence, compared with what would seem the unsurmountable difficulties of preventing the spread of disease by, say, irresponsible insects serving as intermediary hosts in such diseases as malaria, filaria, yellow fever, and others. Yet it is not so; animal pests can be destroyed, mosquitoes can be prevented breeding their kind, but appeal to man's intelligence is well nigh useless in conflict with the passion which determines the infection of syphilis. The disease is, as a rule, contracted by quite young men and women at an age before acquaintance with the world has enabled them to grasp, or it may be to have heard spoken of, the meaning of syphilitic infection or how it is conveyed.

In Western Europe one sees for the most part the individual attacked; in Russia the whole family may suffer. In remote villages the disease, once introduced, not infrequently spreads from child to mother, to grandparents, and to brothers and sisters by kissing the

infant. After pointing out the destructive influence syphilis has upon the body tissues and upon duration of life, Professor Metchnikoff dealt with the prophylaxis of the disease. The proposal that young persons should be told the meaning and danger of promiscuous intercourse and the terrible effect of acquired syphilis was dismissed as impracticable, and as wholly inefficient and undeterrent. Medical inspection of women likely to spread the disease is also an inefficient method, as much of the infection takes place amongst quite young girls before they become declared public prostitutes. Early marriages are not calculated to diminish the evil, owing to the extreme youthfulness of the great proportion of syphilitics, the disease being contracted before even the age at what may be called youthful marriages are wise or usual. Professor Metchnikoff then proceeded to show that the only prophylactic of practical value is the early application of mercury. By experiments on animals, and even on men, by several observers it has been shown that an inunction of metallic mercury, calomel, white precipitate, or salicyl-arsenite of mercury with lanolin of the strength of 1:3 or 1:4 gives satisfactory protective results. Inunction should be thorough, persisted in for four or five minutes, and applied between one and twenty hours after inoculation. The result of experiments is that mercurial ointments may certainly be useful prophylactics against syphilis in all those cases where a contact, however little suspicious, has taken place. Instead of blue ointment, which causes much irritation of the skin and mucous membranes, the use of salves made up with non-irritating mercury salts above mentioned, should be recommended.

Professor Metchnikoff dismisses the contention of persons who would punish sexual delinquents by allowing the disease to run its course as prudish, and sums up the matter by pointing out the effect of allowing the opinions of persons with such beliefs to be heard, in these words:—"Persons who look upon the prophylaxis of syphilis as immoral should apply the same reasoning to the use of antiseptics in midwifery, because it facilitates criminal abortion." Further, he states: "No considerations of a moralising tendency should be opposed to the prevention of so disastrous a calamity as syphilis. True morality ought rather to contribute as much as possible to the prophylaxis of this and many other diseases."

THE TRAINING OF THE INDIAN SUBORDINATE MEDICAL SERVICE.

SOME 250 students of the Punjab Medical College at Lahore recently waited on the Inspector for Civil Hospitals to represent certain grievances. They complain that certain of the native professors are arbitrary and abusive, and desire the right of direct appeal to the Principal. They also represent that their books and appliances are obsolete, and begged that the lectures should be delivered in English, as all have passed a sufficient test in English at the Entrance Examination. The unanimity of the students in this case makes it probable that the above incident is no mere ebullition of the factiousness to which the native student is some-

times prone, more especially as there can be no doubt that they have grave and genuine grounds for their dissatisfaction. As to the merits of their complaints against their native lecturers we have no means of judging, and, in any case, they affect the qualifications of individuals only and not the general question of the system of management of the vernacular medical schools; but the plea of the students is really for European governance and teaching, and is a very remarkable instance of the genuine preference of the Indian for English rule. The young educated Indian is, very naturally, apt to inveigh against his rulers as invaders and oppressors, but where his personal interests are concerned he will generally be found to prefer English professors and judges to his own countrymen. Personally, we think this distrust is generally quite unmerited, but it is possible that the native best knows his own business, and there can be no doubt that in this particular case the students' strictures on the schools and their appliances are quite justifiable, and especially in the matter of available medical literature. The vernacular medical student is so poor that the publication of books to meet his requirements cannot possibly be expected to be a paying transaction, and hence most of those available are practically obsolete *rechauffés* of English text-books, designed to meet the requirements of European students of a past generation. It must be remembered that text-books intended for the use of candidates for full medical qualifications are quite unsuited for the purpose of the vernacular student, as they are over-laden with too much detail to be fitted for the use of men who have but a limited time at their disposal; and hence mere translations of even the best modern text-books, however faithful, will in no way meet the special requirements of the case. To be really suitable, special text-books must be compiled in a more or less "semi-popular" style, and but little writing of the sort has, as yet, been attempted.

As already indicated in our article on "The Problem of Medical Aid in Semi-civilized Countries," we should be the last to propose to convert our Hospital Assistant class into fully qualified practitioners, but are, nevertheless, convinced that such instruction as they are given should be the best available, and that greater ability is required of lecturers who have to teach men less educated than themselves, than of those who have to deal with their own intellectual equals.

Further, it can scarcely be denied that the "Vernacular Medical Schools" are conducted by the Indian Government in far too niggardly a spirit.

The only even nominal European official is the "Principal," but as this official, as Civil surgeon of a great city, has already a very fair job for any two ordinary men on his shoulders, the time he can possibly devote to the school must be so small as to make him little less than an ornamental figurehead.

Under these circumstances the Indian "Superintendents" must needs be the real rulers of the students, and the result must be that they have power without responsibility, while the Principal is responsible, without being able, for want of time, to exercise any real power. In view of the large number of students attending the classes, and the economic importance of the service to the Indian Empire, the

mere description of the present plan of management is a sufficient condemnation. It must not be supposed that we are advocating the entire substitution of European for native lecturers, as these are already far too few to deal properly with the subjects taught; but the teaching staff should be strengthened by the addition of at least two European officers, who should give their entire time to the work, and should be men not too senior to be in recent touch with the latest developments of medical science, and not too junior to possess a thorough knowledge of the vernacular; for though many of the students are fair English scholars, it may be doubted if the majority have a sufficient knowledge of our language to benefit fully by instruction conveyed through it. In making such a recommendation we wish to convey no idea derogatory to the native lecturers, most of whom are able men and most capable practitioners; but they are necessarily rather senior men before their capabilities are discovered, and through no fault of their own, they have lacked all opportunity of post-graduate study, so that the adoption of our suggestion could hardly fail to revolutionise the rather obsolete methods of teaching now in use.

To obtain suitable text-books a substantial reward should be offered by Government for the copyright of the best work for the purpose in each subject in English dress, and the selected text-books should be translated into the vernaculars by a mixed staff of English and Indian medical men.

The schools, too, badly lack apparatus and appliances for illustrating teaching, and these should be supplied.

It can surely not be said that the reforms suggested are either sweeping or costly, and it can hardly be maintained that they would fail to enormously increase the efficiency of the vernacular schools, and the invaluable service which is trained therein. Meanwhile, however, we cannot but think that the students are perfectly justified in indulging in what our Indian medical contemporary elegantly denominates as "grousing."

SERUM-THERAPY OF PLAGUE IN INDIA.¹

LIEUT.-COLONEL W. B. BANNERMAN, the Director, Plague Research Laboratory, Bombay, in his comprehensive and excellent introduction to the "Scientific Memoirs," No. 20, new series, dealing with serum-therapy of plague in India, states that "In view of the somewhat discouraging results obtained among hospital patients in India, it seems necessary to commence anew the study of the serum-therapy of plague."

Anyone who has carefully read the memoirs in question must agree with Lieut.-Colonel Bannerman. That there are indications that the treatment of plague by serum is a step in the right direction there can be no doubt; but that the various sera to hand are administered at times or in doses sufficient to cope with the malady is scarcely apparent.

Lustig's serum.—Haffkine, W. M., contributes a

¹ "Scientific Memoirs," by Officers of the Medical and Sanitary Departments of the Government of India. Calcutta, 1905. New Series, No. 20.

report on a series of 484 cases of plague treated with Lustig's anti-plague serum. The general result was as follows: Among the 484 cases treated with serum there were 55 fewer deaths than among the 484 control cases not treated with serum.

Terni's serum.—Haffkine, W. M., and Costello, C. T., report on 110 cases of plague treated with Terni's anti-plague serum. The general result was: 89 deaths among 110 cases treated with serum, compared with 90 deaths among 110 not treated with serum.

Brazil's serum.—Haffkine, W. M., and West, W. G., report on 70 cases of plague treated with Brazil's anti-plague serum. In the Modikhana Hospital amongst the serum-treated there were 17 deaths out of 20 cases (85 per cent. mortality), against 15 deaths out of 20 control cases not so treated (75 per cent. mortality). These figures show that fewer control cases died than when serum was given.

At the Maratha Hospital the serum-treated numbered 50, died 41 (82 per cent. mortality). Control cases numbered 50, died 45 (90 per cent. mortality).

Roux' serum.—West, W. G., reports on 68 cases treated by Roux' anti-plague serum. The serum treated cases showed a death-rate of 66.17 per cent.; the control cases a death-rate of 60.29 per cent, showing a difference in favour of the control cases of 5.86 per cent. The general drift of the evidence before us is, (1) that the initial effect of the introduction of any serum has the power in many instances of reducing the temperature, the pulse and the respirations. (2) That the favourable initial effect was not maintained. (3) Life would appear to be prolonged for an average of several hours. (4) Decided reduction of the mortality cannot be attributed to the treatment by serum.

DISTRIBUTION OF LIEGE EXHIBITION AWARDS.

THE awards to the British Section of the recent Liège Exhibition were distributed on June 13th. The proceedings took place at the Mansion House, and the Lord Mayor, Alderman W. Vaughan-Morgan, occupied the chair.

Mr. Imre Kiralfy, the British Commissioner-General, read a report upon the exhibition, and the meeting was subsequently addressed by the Belgian Minister, Count de Ialiang, Sir Albert Rollitt, M. Edouard Seve, Sir William Holland, and the Lord Mayor. The diplomas were then presented by Count de Lalaing. A notable feature of the ceremony was the receipt by Burroughs, Wellcome and Co. of five awards of grand prix, three diplomas of honour, three gold medals and one silver medal.

"ATTI DELLA SOCIETA PER GLI STUDI DELLA MALARIA," ROME, 1904.

In this well-known yearly publication, A. Celli gives a masterly *resume* of the work on malaria accomplished in Italy during the year 1904. The epidemic of 1904 was, generally speaking, more serious than those of the preceding years. Benign tertian was predominant in the north of Italy, while in the Roman Compagna and the south of the peninsula the sub-

tertian was the commonest form met with. According to Celli's observation in an epidemic of malaria, cases of relapse are more frequent than cases of primary infection; relapses were extremely common in the hospitals of Rome in 1904 during the months of July and August, suddenly decreasing during September, contrary to the experience of 1903, when relapses were most frequent in September and October. Primary infections were observed to be more common in July and August.

The relation between climatic factors and malaria remains obscure; in the year 1904 the end of the epidemic coincided with the end of the hot season. The economical conditions have a certain indirect influence on the prevalence of the disease; in the more prosperous provinces the use of quinine, as a preventive and curative agent, becomes more general and the cases of malaria decrease. The author gives the results obtained by the method of prophylaxis by quinine given daily in 5 to 8 grain doses. The prophylactic administration of quinine in such doses does not generally give rise to any untoward symptoms. In Celli's experience the daily administration of quinine in the doses mentioned is of greater efficacy than Koch's method of giving a large dose once in seven or ten days. The quinine prophylaxis was in 1904 applied to 52,690 persons, all of whom were much exposed to malarial infection; of these 4,262 got malarial attacks, that is to say, 8.08 per cent. in the year.

For the railway employes, the mechanical prophylaxis by means of wire, mosquito nets, &c., was used, with good results.

In addition to this most interesting report of Celli, the "Atti" contains numerous other memoirs on various subjects relating to malaria. B. Galli Valerio and Jeanne Roshag de Jongh describe their experiments on the biology of *Culex* and *Anopheles*.

Martinetti and Castellini publish the results they have obtained in their endeavour to produce a quinine compound devoid of bitter taste. Ed. and Et. Sergeant report on the epidemiological studies undertaken by them in Algeria.

Other very interesting papers are by Gualdi, Casagrandi, Gaglio and Rossi, for which we refer the reader to the original publication.

Prof. Celli and the "Societa per gli studi della malaria," are to be congratulated for the splendid work accomplished in the fight against the disease which is the scourge of the Roman Compagna and of so many other parts of Italy.

LONDON SCHOOL OF TROPICAL MEDICINE.

ENTERTAINMENT TO THE HON. BOMANJI PETIT.

ON June 11th the Hon. Bomanji Petit, of Bombay, to whom the London School of Tropical Medicine is so deeply indebted for a munificent donation to the funds of the Institution, was entertained at luncheon by the teaching staff and students of the School. Sir Francis Lovell the Dean of the School presided, and amongst those present were: Sir Patrick Manson, Dr. C. W. Daniels the Superintendent of the School, Dr. A. T. Stanton, the Students at the School, and Mr. P. Michelli the Secretary. A hearty welcome was

accorded to Mr. Petit, and the Dean, in proposing his health, referred to the many benefits Mr. Petit had conferred by his philanthropy on several public and scientific institutions in India, and to his generous contribution of a lac of rupees towards the funds of the London School of Tropical Medicine. By his generosity and timely help the School had been largely relieved of the heavy financial burden necessarily incurred at its foundation, and the example he had set had directly benefited the School by inducing others to contribute to this worthy institution, and so to promote the welfare of their fellow subjects in many parts of the Empire. In reference to the present position of the School, which owed its inception to the Right Hon. Joseph Chamberlain, Sir Francis stated that the teaching and appliances in the School were of the most modern character, that much remained to be done in the way of equipment of the museum and library, and in several other directions. Money is wanted for the endowment of lectureships and for research. Recently two new Chairs had been founded, one for the teaching of Protozoology and the other for Helminthology. The Colonial Office had generously helped to establish these lectureships, whereby the efficiency of the School would be greatly enhanced. The advance of tropical pathology had rendered these Chairs a necessity, and it was no less imperative that the subject of Entomology should be placed on a similar footing to Protozoology and Helminthology. When funds were available this would be done, and it was to be hoped that a generous donor would soon come forward to enable the School to attain this desirable object. Since 1899, when the School was opened, over 600 post-graduate students have passed through a course of instruction at the School. Sir Francis closed his remarks by stating the deep indebtedness of the School to the Hon. Bomanji Petit, and expressed the pleasure it had given the Seamen's Hospital Society and the London School of Tropical Medicine to be privileged to entertain Mr. Petit and the members of his family who accompanied him.

The Hon. Bomanji Petit, in his reply, testified to the satisfaction the establishment of the London School of Tropical Medicine had given in India. There were many diseases that required elucidation, but none more urgently than plague, which had caused widespread havoc in India for many years. The prevention of plague ought to be one of the foremost subjects to engage the attention of the teachers connected with the London School, for in India the people looked to the science and skill of western doctors to free them of the scourges which decimate their ranks and materially affected the progress of the country. Mr. Petit urged the members of the School to continue their good work, and to rest assured that India would not forget their labours in the cause of mankind.

We would direct special attention to the article by Dr. E. A. O. Travers and Malcolm Watson on the measures taken to abolish malaria from Klang and Port Swettenham. That these measures have been eminently successful is a matter for universal satisfaction, and ought to stimulate similar efforts in every

part of the tropics. We are glad to note that Major Ronald Ross, C.B., F.R.S., has drawn attention to the results this article indicates in the *Times*, so that the valuable information may reach the ears of governors of colonies and others interested in the hygiene of tropical countries.

COLONIAL NURSING ASSOCIATION.

ANNUAL MEETING.

LORD ELGIN, Secretary of State for the Colonies, in addressing the Colonial Nursing Association at the Colonial Office on June 13th, congratulated the Association on the good work they had accomplished. It is now ten years ago since Mr. Chamberlain initiated the movement which resulted in the Association being founded. In many despatches to the Colonial Office the work done by the nurses sent out by the Association has been referred to as efficient and most helpful, and there seems a tendency on the part of the Colonial Office to incorporate the nurses sent out by the Association as Government employés, and to grant them the privileges of pension attaching to recognition of the kind. Lord Amthill, when moving the adoption of the report, said funds were wanting for the advancement of the Association, and that there were few better ways of showing interest in the Empire than by providing means whereby the public servants of the Crown in distant colonies could be provided with skilled nursing when they were struck down by illness. Sir Frederick Hodgson, in seconding the adoption of the report, testified to the valuable work done by skilled nurses in the colonies with which he was acquainted.

We can add our testimony from several independent sources as to the benefits accruing to the communities in which the nurses of this Association have worked, and it is to be hoped that the members of the committee of management of the Association will in course of time associate with them in their work those who have had practical experience of nursing in tropical colonies.

AN IMPROVED METHOD OF STAINING FOR SCHÜFFNER'S DOTS, &c.

THE following method has produced results so far better than any which I have seen described, that a brief note may be worth publishing; it has also given most excellent results in slides of tropical malaria taken eight months ago, the chromatin being very well stained.

After fixing with absolute alcohol, the slides are dried and at once placed in slide jars containing Giemsa's solution 1-10 to 1-15 until they are deeply, and in fact over-stained (one to three hours should be enough). They are then quickly but thoroughly washed in plenty of water—clean rain-water does not spoil the results, and while still wet, but drained, one or two drops of pure methyl alcohol are dropped on the slide held obliquely, two to three seconds is long enough, and they are at once washed in water, dried, and mounted in the usual way.

Staining with Giemsa on the slide is no good, though it is hard to say why. In a successful prepara-

tion Schüffner's dots are very brilliant, and the substance of the corpuscle is only faintly seen. Washing with methyl alcohol after drying the slide is not quite so good a method as the above, especially with old films.

Reviews.

THE ANÆSTHETIC TECHNIQUE FOR OPERATIONS ON THE NOSE AND THROAT. By A. de Prenderville. (London: H. T. Glaiser, 1906, pp. 88. Illustrated).

Medical men called up to administer an anæsthetic in cases of nose and throat trouble are apt to be anxious as to their capacity to carry out the administration in a manner satisfactory to the patient and the surgeon. The anxiety is natural and justifiable, as any lesion of the respiratory passages tends to increase the difficulty and danger of anæsthesia. In large cities expert anæsthetists, being at hand, should be employed; but in the tropics, as a rule, every medical man has to undertake the administration of anæsthetics in cases of the kind. Dr. Prenderville's book to men so situated should prove a useful and invaluable help, as anæsthesia in nose and throat operations is always fraught with anxiety, and attended by a considerable element of danger. A perusal of Dr. Prenderville's book will enable inexpert anæsthetists to go to work with a degree of confidence they were perhaps not previously possessed of.

Notes and News.

ONE of the difficulties connected with the treatment of plague in India is to convince the people of the advantages of the evacuation of premises in which one or more cases have occurred. They cling to their houses, and thus a whole family may die in rapid succession or in periods extending over weeks. The investigations of the Advisory Committee on Plague, which is pursuing its researches in India, prove beyond question that while the disease is not particularly infectious or contagious and man-to-man infections do not play any important part in spreading it, that rooms and houses in which cases have occurred among persons or rats are very infectious during an epidemic. Those who live or sleep in such places are liable to contract plague, whereas close attendance on patients in hospital or in segregation camps is seldom dangerous. Further, even after houses have been evacuated for a month or even longer, the disease clings to them, and their re-occupation is full of danger. These facts cannot be too widely made known, and they confirm opinions that were formed some time ago. Evacuation, to be effective, must be promptly carried out, and three months may be taken as the period over which it should extend.—*Pioneer Mail*.

PLAGUE INSPECTION IN BURMA.

A SERIOUS FRACAS.

A FRACAS took place in Maymyo Bazaar the other day on the occasion of the first plague

inspection by Captain Simpson of certain houses lying to the east of the town, where the *garrywallahs*' or cabmen's quarters are situated. Captain Simpson was accompanied by Mr. Kirkpatrick, sanitary inspector, and a gang of coolies, with two civil policemen for protection. It was necessary to enter a house where a suspicious case of illness had occurred, but on Captain Simpson attempting to do so the owners resisted, and in a trice a large crowd had collected, numbering two hundred men, who had evidently been in readiness for a row. They attacked the plague gang with sticks and stones, and Captain Simpson was struck with a brick and Mr. Kirkpatrick was somewhat seriously injured. The two policemen were helpless. The matter being reported, a strong body of police started at once with Mr. Murray, D.S.P., and Major Townsend, D.C., to the scene, and some twenty men were arrested and committed for trial. As a result of this all the *garrywallahs* in Maymyo went on strike. Measures are being taken which will probably bring them to their senses, but the strike will affect the Burman and native community chiefly, for these are almost the only customers of *ticca garries*.—*Pioneer Mail*.

HONOURS TO BRITISH RESEARCH LABORATORIES.

Although scientific research receives little encouragement in this country, it is gratifying to find that the labours of British scientists are recognised abroad. The awards to the British Section of the recent Liège Exhibition were distributed at the Mansion House on June 13th, and the following presentations were made:—Wellcome Chemical Research Laboratories, one grand prize, one diploma of honour, and two gold medals; Wellcome Physiological Research Laboratories, one grand prize, and two gold medals. Medals were also awarded to the respective directors of these institutions.

WE refrain from comment upon the tinned meat scandals, although the matter is one of vital importance to tropical residents and travellers. The "scandals" were well known to us for some years, and avoidance of all preparations derived from "meat" in any form has been urged by us in the case of invalid dietary. Fresh beef tea, freshly made meat jellies, freshly prepared scraped beef, have been advocated by all medical men, in preference to the much advertised tinned, canned, or bottled substitutes for the same. It required, however, a sensational "novel" to bring the matter home to the public, and we cannot be too thankful to the writer of "The Jungle" that the whole question of "beef-teas" should have been raised. Medical men, however, can hardly be said to be free from blame in the matter, as they are too apt to yield to the desires of their patients to try some over-advertised "meat juice" or "beef extract." Though less nutritious than ordinary egg albumen, bulk for bulk, and in no sense better or more digestible, some of these may be harmless enough, but their adoption involves heavy and needless expense on people who are often ill able to afford it; and the profession might do much to combat the evil by resolutely refusing to countenance the use of all preparations of the sort

except in the rare cases where the wholesome fresh materials are absolutely unobtainable. All medical men who desire to be ready with arguments as to the valuelessness of these much puffed articles should read Dr. Robert Hutchison's excellent pamphlet on "Patent Foods and Patent Medicines," and the booklet is so plainly written that the laity might do worse than follow their example.

By the death of Professor Schaudinn at the early age of 36, science has sustained an irreparable loss.

RAT FLEAS AND PLAGUE.—An experiment made in Bombay seems to favour the belief that rat fleas convey plague. In a room in which a rat died of plague a number of rats in cages were placed; some of the cages were screened, some unscreened. The rats in the unscreened cages contracted plague, whilst the rats in the protected cages escaped.

DR. NUTTALL, F.R.S., has been appointed Reader in Hygiene at Cambridge University.

READERS of the Journal will regret to know that Lieutenant-Colonel J. E. Nicholson is about to leave England. We are thereby deprived of the valuable assistance he has rendered to the Journal for some time past.

LAHORE Medical Students, owing to alleged harsh and unsympathetic treatment by their native superiors, to the number of 250, have gone "on strike." We hope soon to hear that the students' grievances have been satisfactorily settled.

EXAMINATIONS for entrance into the Royal Army Medical Corps will be held on July 26th 1906. There are forty vacancies.

EXAMINATIONS for entrance into the Indian Medical Service are to be held on July 9th, 1906. There are twenty vacancies.

Dr. J. L. Todd informed the African Trade Section of the Liverpool Chamber of Commerce that in the area of country in Africa infected with sleeping sickness some half a million people died of the disease during the last ten years. Sleeping sickness had spread along the trade route opened up in recent years, and as a means of combating the disease it was suggested that medical posts of inspection should be established at regular distances, so that persons suffering from the disease should be prevented from travelling to districts as yet uninfected.

DEPARTMENT OF HEALTH, ISTHMIAN CANAL.—Colonel Gorgas reports that during the month of April, 1906, there were no cases of yellow fever, plague, or small-pox amongst those employed on the canal; no case of plague since August, 1905, no yellow fever since December, 1905, and no small-pox

during the preceding year. The general health of all sections of the community in the canal zone has much improved lately. Pneumonia was the most serious ailment. The systematic cleansing, disinfection, and destruction of mosquito breeding-places is being maintained.

Personal Notes.

RUTHERFORD, Dr. G. J., Medical Officer of the Gold Coast Colony, has been transferred to the Medical Department of Southern Nigeria.

INDIAN MEDICAL SERVICE.

Promotions:

Lieutenant-Colonel W. Gawen King, C.I.E. (temporary Colonel) is confirmed in that rank, and in the appointment of Inspector-General Civil Hospitals, Bengal.

Retirements.

Colonel Andrew F. Dobson (Madras), Colonel Stephenson Weir (Bombay), Lieutenant Colonel J. Anderson, I.M.S.

Leave.

Captain C. Thomson, priv. leave, 6 w.
Lieutenant-Colonel J. L. Poynder, combined leave, 6 m.
Captain V. E. H. Lindesay, combined leave, 1 y. 51 d.

Postings.

Captain W. Selby, additional Visiting Charge, Budaun.
Captain C. H. Bensely to be Superintendent, Lahore Central District, and Female Jails.

Lieutenant-Colonel H. Hendley to be Civil Surgeon, Lahore; Professor Midwifery, Lahore Medical College; and Medical Officer, Government College.

Captain C. S. Lawson is confirmed Superintendent Central Jail, Ahmedabad.

Captain A. F. W. King to be Professor, Institute Medicine and Pharmacy, Grant Medical College, and Resident Surgeon St. George's Hospital, Bombay.

Captain E. H. G. Hutchinson to be Civil Surgeon, Ratnagiri. The services of Captains Trafford, Pilkington, Lauder and Dunn, and Lieutenant Gill, have been placed at disposal of Punjab Government for plague duty.

Major A. Buchanan to be Civil Surgeon, Nagpur.
Major E. A. R. Newman officiates as Civil Surgeon, Ranchi.
Captain C. A. Lane officiates as Civil Surgeon, Bhagalpur.
Captain J. G. P. Murray acts as second Surgeon, Presidency General Hospital.

Captain H. B. Steen to be Civil Surgeon, Purnea.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Philippines.

Opisthorchis sinensis was discovered in a Japanese patient by Dr. R. P. Strong, and reported by W. J. Mallory, on March 2, 1905, at the annual meeting of the Philippine Islands Medical Association. The parasite inhabits the bile ducts and gall bladder of man, dogs, and cats. It has been met with in the pancreas and occasionally in the duodenum. The fact that the parasite has never been previously described as occurring in the Philippines does not point to infection of the natives of the Philippines, as the patient was a Japanese, and it is well known that the *O. sinensis* is widely prevalent in Japan.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"C. R. Soc. de Biologie," T. lx., p. 160.

ON SOME NEW TRYPANOSOMES OF FRESH WATER FISHES: THEIR EVOLUTION AND METHOD OF TRANSMISSION.

Brumpt, E., describes ten new species of *Trypanosoma* and four of *Trypanoplasma*, and states that the former undergo an evolutionary stage in leeches of the genus *Hemiclepsis*, and the latter in either *Hemiclepsis* or *Piscicola*. Some species of the trypanosomes develop entirely in the stomach, others first in the stomach afterwards in the intestine, and finally the parasites are found in the sheath of the suctorial mouth; while a third category, such as *T. Danilevskyi*, develop first in the stomach and then in the mouth-sheath. The development of *T. granulosum*, sp.n., of the eel is described in greater detail. The forms found in the stomach are pear-shaped, with the centrosome near or in front of the nucleus. These multiply actively in the stomach, but the forms met with in the intestine are very elongated, resembling *Herpetomonas*, while those found in the mouth-sheath are of the trypanosome type, and the parasites with which the fish are inoculated by the leeches are always of this form.

Those developing in the stomach have the peculiarity of losing their flagella and undergoing several fissions in this form before regaining their lashes.

"Archiv für Schiffs und Tropen Hygiene," vol. x., No. 2.

PROPHYLAXIS OF MALARIA.

Celli believes (1) that the exhibition of quinine as a means of preventing malarial fever should be continued daily in doses of 6 to 9 grains (40 to 60 centigrams). (2) The addition of arsenic and iron to the quinine in chronic malaria is probably useless. (3) The best form of administering quinine is in the form of the bisulphate or hydrochlorate in sugar-coated pills. (4) Cinchonism is more apt to prevail when quinine is given at intervals of some days than when exhibited daily. (5) The tonic effect of quinine is of value in persons infected with malaria.

Although quinine-taking is a valuable prophylaxis, it should never be allowed to interfere with the sanitary measures calculated to eradicate the Anopheles from the malaria-infected area. Whilst new ground is being opened up, and until sanitary measures are fully established, there can be no doubt quinine is the most efficient of all prophylactic measures.

"Wien Med. Wochenschrift," October, 1905.

THE TREATMENT OF DYSENTERY.

Kraus and Dörr have come to the conclusion that the *Bacillus dysenteriae* are not identical. From Shiga's bacillus a soluble toxin has been isolated, and the type of dysentery it causes is that of a local bowel infection where the toxins are elaborated, resembling the action of the diphtheria bacillus. No toxin has been isolated from the bacillus of Flexner, so that the poison is intracellular, comparable to the bacilli of typhoid and cholera. Kraus and Dörr have produced an antitoxin which has proved effectual in cases of dysentery due to the *Bacillus dysenteriae* of Shiga; 20 cc. of the antitoxin were injected subcutaneously, and the signs and symptoms of dysentery speedily subsided. The antitoxin is of no value in counteracting the intracellular poison of Flexner.

"Bulletin General de Therapeutique," November 23, 1905.

GENTIAN IN THE TREATMENT OF MALARIA.

Tauret, Dr. George, has isolated a glucoside from the fresh root of gentian, termed gentiopierine. This drug, in doses (cachets) of from 7 to 46 grains, was administered in definite cases of malaria, some two to four hours before the probable onset of the malarial attack. As gentiopierine in large doses acts as a purgative, it should be given with the food, or a little bismuth may be administered with it.

Beside gentiopierine, another glucoside, gentiomarine, is met with in gentian, and the combination of these two glucosides may be exhibited as an alcoholic extract of fresh gentian root in syrup. The treatment may be required to be continued from one to three weeks.

A CASE OF TROPICAL ULCERATION INVOLVING THE NOSE, PHARYNX, AND LARYNX, WITH HISTOLOGICAL FINDINGS.

Arnold, W. F., and Fordyce, J. A., in a paper read before the American Dermatological Association in December, 1905, described a granuloma, involving the nose, pharynx and larynx, termed "tropical ulceration" of these parts. The microscopic findings excluded blastomycosis, actinomycosis, rhinoscleroma, leprosy and tubercle; syphilis and yaws were also excluded by the fact that the usual specific remedies for these diseases were ineffectual. Mycosis fungoides seemed to be negatived as a cause owing to the absence of fragmentation and the character of the infiltrate.

"Philippine Journal of Science," January, 1906.

TROPICAL ULCERATIONS OF THE SKIN.

Strong, R. P., describes tropical ulcerations of the skin, as met with in the Philippines, under three headings: (1) Cases resembling Oriental sore; the lesion is single and in the surrounding tissues Strong found "cockle shell" oval bodies, in diameter from 3 to 4 micra, resembling Leishman bodies, and met with free and within endothelial phagocytic cells. They are regarded by Strong as parasites and to be forms of blastomycetes. (2) Cases in which the lesion is single, commencing as a red spot which enlarges, hardens, discharges and scabs. No protozoa were found, but a bacillus of the *Staphylococcus pyogenes aureus* native was met with. (3) Cases in which the lesion is multiple, beginning as vesicles or pustules and breaking down into ulcers.

Bacteria do not seem to act as a causative factor in this group, which may be due instead to a blastomycetic agent, although no organisms of this nature have been observed.

"Journ. Exper. Zool.," vol. ii., p. 585.

THE EVOLUTION OF THE HYPOTRYCHOUS INFUSORIA.

Woodruff, L. L. This is a sequel to Calkins' remarkable study of the evolution of the Paramecia, and has been carried out by his methods and under his direction, though the results are hardly as definite. The observations were devoted to *Oxytricha fallax*, *Pleurotrichia lanceolata*, and *Gastrosyla steinii*, the culture medium being hay infusion. All three species multiplied solely by transverse fission without conjugation, passing daily through periods where the division was less frequent, but in the end all die unless the race be rejuvenated either by conjugation or by change of medium. Like Calkins, he found that a cultivation that had become very languid revived at once to a considerable extent by substituting beef infusion for hay infusion, but a second experiment was not so successful, and the series died out in 20½ months after the very considerable figure of 860 asexual generations. The periods of depression were characterised not only by feeble multiplication and the commonness of pathological forms, but by alterations of the protoplasm, which became more and more vacuolated, the macronuclei broke up, while the micronuclei became more numerous, and lastly the ciliary apparatus atrophied. This was associated with an increase in the size of the individuals, which become smaller as the rate of multiplication accelerated.

rates. No inclination to conjugation was ever noted in the cultivations, and all attempts to bring this about failed.

Numerous observations were made on the action of various salts. KH_2PO_4 , K_2SO_4 and KBr applied once accelerated, whilst K_2HPO_4 , KCl , NaCl and MgSO_4 retarded division. In daily doses KH_2PO_4 and KBr markedly accelerated, while KH_2PO_4 , KCl and NaCl strongly retarded division.

Light appeared to have no direct influence on the rate of division of *Oxytricha fallax*.

"Bulletin de L'Institut Pasteur," T. iv., p. 346.

Prof. Mesnil, in Kolle and Wassermann's "Handbuch der Pathog. Mikro-organ." G. Fisher, Jena.

Nocht, B., and Mayer, Martin, on the pathogenic trypanosomes. This chapter of the above handbook gives a clear and definite picture of this important subject. Passing over the history of the subject, the authors proceed at once to define the two genera *Trypanosoma* and *Trypanoplasma*, and describe the methods of examination and the cytological and evolutionary characters of these organisms. Stress is laid on Prowazek's work on *T. Lewisii* and on Schaudinn's views on the hematozoa of birds, though they have not been able to include the more recent investigations of the latter authority, which have led him to considerably modify his views as to the inter-relations of the trypanosomes and the spirochaetes.

In any case they should have noticed the views of Novy and McNeal, which are opposed to those of Schaudinn.

The authors adopt Koch's classification, and, although it is not usually a pathogenic organism, commence with the study of *T. Lewisii*, on account, no doubt, of the large amount of attention that has been devoted to that species.

The chapters on *nagana*, *surra*, *caderas*, *dourine*, *galzichte*, Gambian trypanosomiasis and sleeping sickness, are well written, and usually uniform and well balanced, and include a certain number of personal observations, notably on the pathogenic action of the two races of *T. Gambiense* on different animals. The analyst considers, however, that it would be more logical to place Zousfana disease beside *nagana*, especially as they very justly insist on the difference between *surra* and *nagana*, based on the difference between the insects which act as vehicles of these diseases. The therapeutics of this subject are condensed into a separate chapter, and it is somewhat surprising to find no mention either of atoxyl or of the arsenic-trypanoth combination.

The non-pathogenic trypanosomes of mammals and other vertebrates are barely mentioned, nor are those which are almost undoubtedly pathogenic in fish, and which might well have formed the subject of a separate chapter. The tsetse flies are dismissed in a couple of pages, but an excellent double plate in contours somewhat compensates for this brevity. The other coloured plate gives a good idea of *T. Lewisii*, and of the various pathogenic species, and the microphotographs are equally successful.

Proceedings Royal Society, Series B., vol. lxxvi., p. 284.

THE DEVELOPMENT OF THE HERPETOMONAS OF KALA AZAR AND CACHEXIAL FEVER FROM LEISHMAN-DONOVAN BODIES.

Rogers, Major Leonard, I.M.S., who claims to have discovered flagellate forms of the *Piroplasma Donovanii*, investigates the conditions most favourable to the development of these forms. He has already stated that these are best met by the employment of citrated human blood, slightly acidulated with citric acid, and it is further important that the medium should be free from bacteria, which impede the development of the parasites and bring about their degeneration. The most favourable temperature is 22° C. With Novy's medium (gelose blood) the results were negative. Under these conditions the small piroplasma forms, obtained by spleen-puncture, undergo rapid development, the course of which is clearly shown in an accompanying plate. After forty-eight hours the parasites have

attained their largest dimensions, and some flagellate forms appear. The small nucleus or centrosome is now in relation with an eosinophile body which is constantly found in the subsequent flagellate forms. These latter, during subsequent days, are alone found, and are typical Herpetomonads. The centrosome is always in front of the nucleus and no trace of undulating membrane can ever be made out. Major Rogers proposes to call this the parasite of Kala Azar, and if, as thus seems possible, the Herpetomonoid forms of his cultures represent the most evolved stage of the organism, the term *P. Donovanii* should sink, and *Herpetomonas Donovanii* should be substituted for it.

Longitudinal division of the flagellate forms is also figured and described. The author remarks that the fact of acidity of the culture medium being favourable, tends to the probability that the intermediate host of the parasite is an insect, and he has actually obtained flagellate forms by mixing infected spleen blood with the stomach juices of a louse. Lastly, the fact that a temperature of 22° C. is most favourable to the development of the parasite explains the seasonal prevalence of the disease.

Journal of Tropical Veterinary Medicine, vol. i., p. 5.

A NEW TRYPANOSOME OF RATS.

Lingard, A.—The specimens described were found in the blood of *Mus niviventer* and *M. decumanus*, and differ from the types of *Trypanosoma Lewisii*, with which they are associated in having the hinder end so produced as to resemble a posterior flagellum, much longer than the true anterior one. The portion of the parasite behind the centrosome averages 19 μ , as against 6 μ in *Lewisii*. In other respects, *e.g.*, in the forward position of the nucleus, the new species, which he names *T. longicaudense*, recalls *T. Lewisii*. The author proposes to facilitate the recognition of species by recording the length from the centrosome to the hinder extremity, that from the centrosome to the nucleus, the length of the nucleus, that from the anterior border of the nucleus to the anterior end of the body of the parasite, and the length of the flagellum; the sum of the five data giving the total length, and lastly, the greatest breadth. He gives their measurements for his new species, for *Lewisii*, *Evansi*, *equiperdum*, and for a trypanosome which he calls *Himalayanum*, found by him in the blood of cattle in the hills. This last is a long, thin species 75 m. long by 3.25 m. wide.

"C. R. Soc. Biologie," T. lx., p. 124.

A CASE OF SPIRILLOSIS IN THE HORSE, OBSERVED IN FRENCH GUINEA.

Martin, Gustav, describes a spirillum 12.15 μ long, by 0.25 μ wide, with 3-4 turns in the spiral. When observed, the horse was wasted and showed arching of the back with paresis of the hind quarters. Inoculation of other animals gave negative results. Two and a half months after, the horse was in good condition and its blood free from spirilla.

"Centralbl. f. Bakter.," I., Original, T. xl., p. 408.

THE MODIFICATIONS OF THE SERUM OF INTERMEDIATE CARRIERS OF THE CHOLERA VIBRIO.

Friedberger, E. By the term intermediate carriers of cholera (*cholera-bazillenzwischenträger*) the author refers to persons who, though to all appearance perfectly healthy, continue for some time to eliminate cholera bacilli in their stools. During the last epidemic in Germany he met with three cases of persons isolated from infected places, who, without even showing the least sign of cholera, nevertheless for periods of from three to nine days produced stools containing cholera vibrios. On testing the serum drawn from these persons it was found to have a bactericidal power 100 to 500 times above the normal; while on the other hand the agglutinating power alike for the cholera and for other vibrios was scarcely appreciable. To explain the presence of these peculiar properties in the serum of

these persons, the author assumes that they must have suffered from an infection of the intestinal mucosa, but of so mild a character as to arouse no suspicion of its existence in their minds; as in persons having normal intestinal mucous membranes, enormous quantities of microbes require to be introduced to produce such marked modification of their serum.

The observation is, of course, of great practical interest, as it explains how the infection of cholera may be introduced into new localities, at great distances, by a person showing no sign whatever of disease.

"Zeitschrift f. Hygiene," T. III., p. 263.

THE ACTION OF "BRILLIANT GREEN" ON THE NAGANA TRYPAOSOME.

Wendelstadt, H., and Fellmer, T., are continuing their researches on the treatment of nagana with the colours of the triphenylmethane series. The authors have tested the action of this colour (sulphate of tetraethyldipara-amido triphenylcarbinol) in the same way they have already tested malachite green. Like the latter colour, but in a less degree, this green has the drawback of causing sloughing when used hypodermically, and of producing irritation and atrophy of the spleen when introduced into the peritoneal cavity.

Doses of 1 cc. of a $\frac{1}{2}$ per cent. aqueous solution hypodermically, or of 1 to 2,000 to 2,500 into the peritoneum, uniformly brought about the disappearance of the *Trypanosoma Brucei* from the circulation of rats infected four days before with nagana. But the trypanosomes reappeared after six or seven days, so as to make a fresh dose necessary. Under this treatment, they succeeded in keeping a rat as long as seventy-two days, while control animals died in five to six days, but in the end the animals under treatment succumbed to poisoning with the drug, and in no case was a cure obtained.

The best plan of administration is in three successive doses of 1 cc. of $\frac{1}{2}$ per cent. solution, on the fourth, sixth, and ninth day after infection. Following up Laveran's experiment of combining arsenic with trypan-red, they tried the effect of following up the three doses of the dye by a daily injection of 1 mgr. of arsenic. In three series, out of ten rats, one rat in the first series alone appears to have been cured, doses of 3 cc. of its blood failing to infect. In the second series the blood of four rats killed during the course of the treatment, was not infective in doses of 2 to 3 cc.; four others died no doubt from poisoning with the dye; one relapsed, and only one has been cured, being still alive after five months. This was the only instance of cure, other animals having been kept up to four months, but without being cured, and the authors attribute the comparatively good results obtained in this series to the fact that the treatment was commenced forty-eight hours after infection, and not as usual after three days. It is noteworthy that rats inoculated with the blood of some of the animals under treatment showed after a fortnight numbers of trypanosomes, which presented a vague outline and a generally curious appearance, and which disappeared the next day, but these rats showed no immunity two and a half months after.

A *Macacus rhesus* monkey was also treated; and as the first treatment with the green alone did not suffice, the combination with arsenic was adopted. After about seven months of repeated efforts the monkey is definitely cured, and it is an interesting and probably unique fact that it has since proved refractory to two successive inoculations with trypanosomes. In doses of $\frac{1}{2}$ cc. the serum of this monkey causes the immediate disappearance of the trypanosomes from the blood of strongly infected rats, and is strongly agglutinating *in vitro*, while the serum of normal monkeys has no such action. A dog was also experimented on, but without much success. The rest of the memoir is occupied with a description of the changes produced in the trypano-

somes under the action of the dye. A large clear vacuole appears around the centrosome, and a variety of other involution forms, which the authors compare to the Leishman-Donovan bodies, are described in the spleen, but the significance of these changes is uncertain.

"Transvaal Medical Journal," May, 1906.

ANKYLOSTOMIASIS IN TRANSVAAL MINES.

The above journal, in an editorial headed "Danger," draws attention to the prevalence of ankylostomiasis among the native miners on the Witwatersrand; the ova of the ankylostomum have also been found in specimens of underground soil. Although these facts are new, the journal remarks that it seems inexplicable that a vital matter such as the spread of ankylostomiasis should be treated with mysterious silence and inactivity. On this subject it may be remarked that the reports of medical men are, as a rule, disregarded by the community, and it requires some lay novelist or penny-a-liner in the lay Press to conjure up an alarming picture with an hysterical pen to bring the matter home to the people.

THE INCREASE OF MEDICAL MEN IN THE TRANSVAAL.

At the recent annual dinner of the Transvaal Medical Society the matter of the influx of medical men was spoken of with some concern. The accession to the ranks of medical practitioners was stated to be out of all proportion to the increase of population. The increase of contract practice and how to stem it is the problem which at present confronts the medical profession in the Transvaal, for there can be no doubt this sort of practice, once begun, is difficult to get rid of. Whilst the total earnings of the medical profession in the Transvaal have probably decreased since the pre-war days, the number of practitioners has doubled. Under these circumstances it is difficult to find a ready solution, but were the medical papers in Britain to make it widely known that the Transvaal is "over-doctored" at present, a check might be given to still further congesting the already plethoric ranks of the profession in South Africa.

"The Journal of Experimental Medicine," May 25, 1906.

THE RELATION OF TYPES OF DIARRHŒA IN CHILDREN TO STRAINS OF BACILLUS DYSENTERIÆ.

Knox, J. H. M., and Schorer, E. H., from their inquiry into this subject, found that the association of the dysentery bacillus with diarrhœa in infants is now established. After the study of 74 cases of diarrhœa in infants they found: (1) The Shiga type of bacillus present to the exclusion of other pathogenic species on aerobic plates in 4 cases. (2) The "Y" bacillus of Hiss was proved to be present in 14 cases. (3) The Flexner-Manila bacillus occurred in 3 cases. (4) Cases in which the dysentery bacillus was isolated, but not determined, numbered 3. (5) A lactose-fermenting dysentery-like organism was obtained in 2 instances. (6) Combined dysentery bacillus and streptococcal infection occurred in 11 cases. (7) Streptococci only were encountered in the pathogenic bacterial species in 6 cases. (8) A pathogenic colon bacillus was isolated in 2 cases. (9) No pathogenic organism or organism agglutinating with the patient's blood was found in 10 cases. (10) More than one bacillus was present in 13 cases. The combinations were as follows:—Group 1 and 4, 2 cases; group 1 and 2, 3 cases; group 1, 2 and 4, 2 cases; group 1, 2, 3, 4, and lactose, 1 case; group 2 and 4, 5 cases.

Bacilli dysenteriae occurred in 73.1 per cent. of cases studied, or without the lactose-fermenting organism, which is probably not a true dysentery bacillus, 70 per cent. The character of the intestinal lesions found at autopsies were extremely various and without definite relation to the types of infecting dysentery bacilli; and it would appear that no distinction, except possibly as regards degree, can be drawn between the lesions produced by any of the given types of the dysentery bacillus.

The serious nature of the ailments from which the observations were taken may be gauged by the fact that 31 children of the 74 in question died.

"Il Policlinico," Rome, June, 1906.

THE EFFECT OF THE X-RAYS ON MALARIAL DISEASES.

"L'azione dei raggi Röntgen nell'infezione malarica." By Dr. Alberto Demarchi.

For obvious reasons it was not an easy matter to study the action of the X-rays when applied directly to the malarial parasites; for this reason Dr. Demarchi had to restrict his observations mainly to the region of the spleen, but his studies were equally directed to all three species of malarial infection, whether quartan, benign tertian, or æstivo-autumnal.

A microscopic examination of the blood was always made both before and after the application of the X-rays, as also some hours after it.

In all the cases the rays were applied daily, and at all periods of the attack of ague. No accidents had to be recorded, whether local or general, with one solitary exception when a slight erythema appeared over the irradiated region. The patients were subjected to rays with a penetration of No. 6 Benoist, and the quantity of the rays absorbed at each sitting was equal to 2 H units.

The results of Dr. Demarchi's researches may be summed as follows:—

(1) The application of X-rays over the splenic region does not affect or in any way modify the course of the malarial attack.

(2) These applications exercise no action whatever on the number, the vitality, or the normal cycle of development of the malarial parasites of whatever species they may belong to.

(3) They are not capable of causing or of accelerating a relapse.

(4) The X-rays have a manifest action on the reduction of the swelling of a spleen if chronic.

(5) These rays may possibly exercise a favourable action in preventing relapses of the infection.—(J. E. N.)

**"Journal of the American Medical Association,"
May 12, 1906.**

TREATMENT OF SNAKEBITE.

Crum, C. W. R., M.D., treats bites of the copperhead snakes by freezing the area around the bite with ethyl chloride spray; he then makes two parallel incisions almost an inch in length, through the wounds made by the fangs; the part is then soaked for a few minutes in strong permanganate of potassium solution and dressings applied wet with this solution; the edge of the dressing is raised every half hour or hour and a fresh permanganate solution poured on the wounds.

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Original Communications.

VERRUGA PERUANA.

By M. D. EDER, M.R.C.S., L.R.C.P., B.Sc.LOND.

DR. TAMAYO¹ may fairly claim to have solved this mystery of the High Andes. The disease has been known to Europeans since the sixteenth century, and, as Hirsch observes, its mortality for the white man was made manifest when it caused the death of more than one-fourth of Pizarro's small army of 700 men. In later years even greater havoc has been wrought. In 1874 a party of 40 sailors deserted from a British ship to work upon the Trans-Andean Railway; in the course of seven or eight months 30 were dead of verruga.

Hirsch gives the mortality as 6 per cent. for Indians and negroes, 12 per cent. to 16 per cent. for whites, amongst whom in epidemic form it may reach 40 per cent.

Regarding the nomenclature, the term "Carrion's disease" has been applied to the pernicious febrile form since 1885, when Daniel Carrion, a Peruvian medical student, inoculated himself in both arms with the blood taken from a verruga excrescence. He developed a severe illness on the 21st or 23rd day and died fifteen days later, *without the appearance of any eruption*. It is also known as Oroya fever, from the narrow valley of Oroya, where the disease is endemic.

I can find no one previously to Dr. Tamayo who has considered the possibility that the verruga and the severe symptoms of Carrion's disease are independent conditions, having a purely coincidental relationship. Dr. Tamayo does indeed hint at the verruga being favoured by the more serious disease, but I think this must have been an idea thrown out to lessen shock among his audience.

From my own experience I should say there is no disease in South America (and I speak from knowledge gained in three Republics) which is so frequently overlooked or wrongly diagnosed as enteric fever. In recent years malaria could be excluded, of course, by a blood examination, not always, however, for it is a frequently co-existing condition in other diseases. But a positive diagnosis of enteric is something quite different. The Widal reaction was not available in the Hinterland, away from laboratories; I should imagine that the Parke-Davis's Typhoid Agglutometer might prove of immense value to the medical man in isolated districts where laboratories and consultations are unattainable.

The possibility that Carrion's disease is enteric fever is so engrossing in itself, and so important is the question of enteric fever in the tropics, that some little attention to the current descriptions of verruga will not be without general interest.

Tamayo himself suggests that Carrion fever is a

para-typhoid disease; I should be content to leave it at that, but I must draw attention to a few weak points in his paper.²

(1) The doses and strengths of the inoculation experiments are vaguely given as a few drops, a strong dose, &c. The author refers to a table which does not, however, accompany the articles, but as the paper was read at a medical meeting, the table may have been exhibited there. That table possibly gives the exact doses and strengths used.

(2) The differentiation from Eberth's bacillus or other members of the typhoid group is incomplete, more especially as no polysaccharide fractional differentiation is mentioned. But Tamayo states that he is still engaged on the complete differentiation of Barton's bacillus, and he promises to give the results in a later paper.

(3) The most serious omission is the incomplete description of the *post mortems*, both of the animals that died after inoculation, and of the patients who died during the course of the malady. We are told, indeed, that nothing particular was observed, and this even in cases where there had been during life abundant diarrhoea, enlarged liver and spleen, &c. The condition of the intestines is not once alluded to. I must ask readers not to conclude from this that no ulcerations of Peyer's glands were present. There is nothing to show that the intestines were examined. Positive evidence would here strengthen the case enormously, but the negative evidence must not be allowed to influence us too severely. Imperfect observations are a frequent fault of *post mortems* made in tropical South America as well as elsewhere.

A study of Dr. Tamayo's paper in conjunction with the following extracts will, I think, convince the most sceptical that Carrion's pernicious fever, Oroya fever—the severe fever of verruga—is nothing but enteric fever.

Relationship of Verruga to Yaws.—Manson [1] writes: "If difference there be in their clinical features between verruga and yaws, apparently it is more one of degree than of kind." Scheube [2] is to the same effect. "I am, therefore, inclined to the opinion that the two diseases (yaws and verruga) are nearly related, verruga being nothing more than a severe form of frambœsia or yaws, modified partly by the high altitudes of the region where it occurs and partly by being complicated with malaria."

On the other hand, Hirsch [3] denies any relationship, whilst Dr. Plehn [4] states, "verruca and frambœsia were formerly considered related diseases, but the former has nothing but a superficial resemblance with that skin disease." Jeanselme [5] is equally emphatic, "*c'est à tort qu'on a voulu identifier la verruga avec le pian.*"

I will return to this question again.

Ætiology.—Certain waters of the endemic districts have always been locally under suspicion (aguas de verruga is the term). Dr. Plehn follows Hirsch, who quotes Dounon's experience; he and his followers drank the waters and were not affected. Plehn further

¹ *La Crónica Médica Lima*, Nos. 406 and 407, 1905. Apuntes sobre la bacteriología de la enfermedad de Carrion, por el Dr. M. O. Tamayo.

² Abstract, JOURNAL OF TROPICAL MEDICINE, May 15th, 1906. Page 159.

points out that people suffer from verruga who have never drunk the suspected waters.

Both statements are, of course, consistent with the view that the water is contaminated by typhoid excreta. (We remember that Dr. Klein swallowed a culture of Koch's cholera bacilli with impunity.) Some of Dounon's followers may have been immune to typhoid fever from a previous attack, nor would the water be the sole source of infection—direct contagion is common where there is no strict hygiene.

Pathological Anatomy.—The mucous membrane of the intestine is occasionally hyperæmic. *The solitary follicles and Peyer's glands are generally enlarged.* Sometimes ulcerations are discovered in the intestine as well as in the stomach. Scheube treats these as ulcerated verruga, but offers no proof; are they typhoid ulcers? All the lymphatic glands appear swollen, the mesenteric glands more especially so. The liver and spleen are enlarged. (Scheube and Plehn.)

Bacteriology.—In 1898 some growths were examined by Charles Nicolle [6], who reported that he had found a "microbe pathogène nouveau à ranger dans la catégorie des microorganismes dont le bacille de Koch est le type. Ce serait un Sclerothrix." M. Letulle and Izquierdo confirm the presence of an acid-fast bacillus.

The presence of this organism counts for little or nothing in the absence of inoculation experiments.

Dr. Barton's important paper referred to by Tamayo was read in 1898 or 1899 to the Sociedad Médica Union Fernandina of Lima. I can trace no reference to this paper, but Tamayo is sufficiently explicit. Barton was the first to isolate an organism from the blood of patients suffering from verruga.

Tamayo, working with Ugo Biffi and J. C. Gastiaburù, confirms all Barton's work in so far as it is morphological.

Dr. Odriozola [7] also refers to the presence of these micro-organisms in the blood, which grow readily at 37° C. on all media.

Jeanselme (loc. cit) suggests that the fever "qui est aujourd'hui définitivement rattachée à la verruga est une forme aiguë septicémique." Firth [8] thought that Carrion's death might have been due to septic infection.

Plehn, Jeanselme, and Firth (who seem to be the only recent European writers on the subject to have seen any cases), scout very properly any connection between malaria and verruga.

Tschudi, in 1845, noted that death may sometimes occur at the commencement of the disease with typhoid, i.e., septicæmic symptoms (quoted by Hirsch).

Firth suggested that the disease was due to a parasite worm, whose first stage is passed in the mud (he thus accepts the view of water being a factor in the causation). Plehn (loc. cit.) likewise broaches the possibility of some trypanosome infection. (Parasit welcher den trypanosomen vielleicht nahesteht.)

Immunity.—Jeanselme states that one attack confers a fairly long period of immunity.

Incubation of the Disease.—Carrion's fatal experiment established this at about twenty-one to twenty-three days (cp. enteric).

Varieties described in the Text Books.—(1) Fulminating, in which there is no eruption, most writers

concurring in the opinion that death ensues before the eruption has time to appear. Naturally, there can be no proof of this.

(2) Pernicious febrile form (Fièvre grave de Carrion). This disease lasts two to six weeks, and has a high mortality.

(a) With eruption—which may appear at any time during the disease—sometimes just before death, or sometimes during convalescence.

(b) Without eruption.

In some fatal cases, however, verruga has been found in the internal organs (see list compiled from Tamayo, case 3. JOURNAL OF TROPICAL MEDICINE, May 15th, 1906, p. 160).

(3) Chronic form. This may drag on for years; and then, as Dr. Plehn [9] states with a touch of unconscious humour, these cases may still have a fatal issue. (Although no one has suggested that chronic verruga would confer immortality.)

Symptoms and Course.—I give the outlines from Plehn, with whom other writers are in general agreement.

Fever, remittent or intermittent, extending over some weeks. Hyperpyrexia has been known. In some cases fever falls below the normal some days before death (cp. the typhoid condition in enteric).

In favourable cases sleeplessness and other symptoms gradually disappear as the fever abates; appetite returns, and, except for the weakness, patient is well.

Headache and pains in the limbs during the first one or two weeks. Delirium, coma, nausea, vomiting, diarrhœa, dysenteric stools—more rarely there is constipation (see Tamayo's cases). The abdomen is tender. Liver, spleen, and mesenteric glands enlarged. Anæmia, sallow complexion, sometimes jaundice. Hypostatic pneumonia; cardiac failure.

Hæmorrhages from different organs.

Petechial eruption, which sometimes resembles purpura hæmorrhagica (cp. enteric; out of Osler's 829 cases, there were 25 with purpuric spots. Osler. Fifth edition, p. 17).

Differential Diagnosis.—It is significant that Wurtz and Thiroux [10] do not mention enteric amongst the difficulties. Their list of diseases with which verruga may be confused is (1) malaria, (2) acute hepatitis, (3) acute yellow atrophy, (4) acute miliary tuberculosis (5) pyæmia, (6) rheumatic fever.

Acute yellow atrophy is rare everywhere; rheumatic fever uncommon in tropical South America, but enteric is ubiquitous and common. Tamayo and his fellow workers have, I believe, proved that verruga peruana is a benign disease, running a chronic course, consisting essentially in the formation of granulomatous eruptions on the skin, and in the mucous membranes and organs.

The resemblance of these tumours to those of yaws is unmistakeable in the photographs (see them in Odriozola's work or Plehn's article). The main difference is that yaws is said not to occur in the internal organs. It does occur, however, on the mucous membranes of the cheeks, gums, and in the vulva (Hirsch). According to Van Leent, quoted by Hirsch, yaws is found in the internal organs, spleen, liver, &c. May not the fact of this having been doubted (see Hirsch) be due to the fact that the outcome of yaws is "always

towards a cure." Hence *post mortems* must be rare; whilst in verruga they have been relatively frequent, owing to the fatality of the frequently associated Carrion's fever.

As an objection to the identity of the latter with enteric fever, it may be said that there is in the clinical accounts an absence of the usual abdominal complications, such as perforation. This is true, although hæmorrhage from the bowels is noted, and amongst the sequelæ are given nervous affections. Possibly when the attention of Peruvian clinicians is drawn to Tamayo's suggestion, we may receive further information regarding the presence or absence of the abdominal complications.

To sum up, Carrion's pernicious fever is typhoid fever occurring in the tropics.

Verruga Peruana is yaws occurring in a district in Peru where typhoid is endemic. The two diseases are thus often found in the same subject.

The casual agent of verruga is unknown; hitherto, as was natural, research has been mainly bacteriological. It would, however, seem advisable to examine the freshly excised granulomata for spirochæta, or, as Mr. T. P. Beddoes suggests to me, for some form of amœba.

REFERENCES.

- [1] MANSON. Tropical Diseases, 1900, p. 468.
- [2] SCHEUBE. The Diseases of Warm Countries. Second Edition of English Translation, by P. Falcke.
- [3] HIRSCH. Handbook of Geographical and Historical Pathology, 1883, vol. ii., Sydenham Society.
- [4] DR. A. PLEHN. Handbuch der Tropenkrankheiten Dr. Carl Menze, 1905, Article. Die Akuten Exantheme. Verruga Peruviana.
- [5] JEANSELME. Nouveau traité de Médecine et de Thérapeutique. Brouardel et A. Gilbert. Fasc. iv. Maladies exotiques, 1906.
- [6] NICOLLE. Note sur la bactériologie de la Verruga du Perou. Annales de l'Institut Pasteur, Tome 12, Sept. 1898, p. 591.
- [7] ODRIOZOLA. La Maladie de Carrion, Paris, 1898.
- [8] FIRTH. Allbutt's System of Medicine, vol. ii. Art. Verruga.
- [9] Über Jahre sich hinziehenden, zum Teil zuletzt freilich ebenfalls tödlich endenden Formen (Plehn, loc. cit. p. 439).
- [10] WURTZ AND THIROUX. Diagnostic et Sémeiologie des Maladies Tropicales, p. 58. Paris, 1905.

A NOTE ON THE HABITS OF ORNITHODOROS MOUBATA.

(Observation of Two Gravid Females.)

By F. C. WELLMAN, M.D.

MR. R. NEWSTEAD in his paper "On the Pathogenic Ticks Concerned in the Distribution of Disease in Man, with Special Reference to the Differential Characters of *Ornithodoros moubata*" (read at the last meeting of the British Medical Association, held at Leicester)¹ states (what is true of most ticks) in his remarks on the family in general, that a fully engorged tick . . . after fecundation invariably falls from its host. *Egg laying takes place shortly afterwards, and the animal subsequently dies.*² Later, however, in speaking of *O. moubata* he does not state the length

of time between the feeding (and fecundation) of the tick observed by him and its egg laying (although he gives the dates on which the eggs were laid), nor how long the parent lived after ovipositing. Now *O. moubata* is (in some instances at least) an exception in this respect to other observed ticks, and what Mr. Newstead omits (rather than what he says) makes his sketch of the part of its life history discussed by him misleading. I extract from my recent report¹ to the American Society of Tropical Medicine concerning this tick the following observations which, if read in connection with Mr. Newstead's paper above mentioned, will give any one interested a much clearer idea of the matter. "Ticks were fed on the blood of a young pig. Copulation was seen in two instances, the ticks grasping each other with their legs and approximating the dorsal surfaces of their bodies. Two large impregnated females were placed in a covered glass dish in which was a handful of dust from the floor, into which the ticks immediately burrowed. They were given no food and examined frequently. *It was nearly two months (fifty-seven days) before any eggs were laid. Tick No. 2 did not begin to lay for a week after her companion had finished. Both ticks have been kept to date without food (eleven weeks since laying their eggs) and are still alive and active.*"² In each case the eggs were laid in batches and protected by the parent for several days. Their subsequent history—differentiation of the egg contents in about a week, the quiescent larvæ distinguishable a few days later, and the emergence of octopod nymphs on the fifteenth day—corresponds almost exactly with that given by the late Dr. Dutton and Dr. Todd, and as I have elsewhere published the same in detail from my own personal observations I shall not repeat it here. I have only referred to the matter in order to add important details which are missing from Mr. Newstead's paper as it appears in the JOURNAL. Of course, the paper in question may be but an abstract of a fuller communication including all the data which I have here supplied (I have not seen full reports of the meeting at Leicester), in which case, however, no harm will be done by again calling attention to so interesting and significant a point regarding the life history of an important disease carrier.

Bailundo, West Africa.

January 1st, 1906.

A CLINICAL PICTURE OF RELAPSING FEVER.

By V. G. DESAI, L.M.S.

THE following history is a pen picture of five hundred cases of relapsing fever. The description of this fever is so vague in the text books that the disease can hardly be made out by the bedside. A few of the leading symptoms are not mentioned in any book. An ordinary busy practitioner has to

¹ "On *Ornithodoros moubata*, Murray; a disease-bearing African tick."

² Six months have now passed since the ticks were fed, and about four months since they deposited their eggs. One of them (the one which laid her eggs last) died three weeks ago. The other is still alive and apparently healthy.

¹ Published in this JOURNAL for August 15th, 1905.

² The italics are mine.

depend much on the signs and symptoms of a disease. He cannot go on examining the blood of every patient who comes to him. The writer felt the necessity of such an accurately described clinical history, and that is why he has taken the liberty to write the clinical story of relapsing fever. *It is mainly a tropical disease. It is frequently mistaken for plague in Bombay during the epidemics of the latter disease.*

This fever is only prevalent among the poorer classes of people; for example: butchers, clerks, &c. Such people eat very little fresh vegetables, fruits or fish. Christians living miserably get it. In all these cases it was generally found that the patients were not taking a sufficient quantity of salt with their food. Persons in similar conditions of living are attacked, and so it is thought to be contagious, but it appears not to be so at all. It occurs among people of low vitality. Tubercular persons of fair type are more prone to it. Males are attacked more than females. It generally occurs in outbreaks. Age has nothing to do with it. It occurs in well ventilated houses.

The patient comes to the doctor for pains in the body. The fever comes on without shivering and reaches its maximum height on the second or third day. The patient appears to be very much exhausted. The facial expression indicates that the patient must have been ill for at least two or three months. His conjunctivæ are yellow or a tinge of it is usually there. There is no sickly smell about him, as in cases of typhoid or pyæmia. The temperature depends on the constitution of the person; it is higher in thin and fair-skinned people. In fat and dark-skinned people it is less marked.

The skin in many cases is coloured a light yellow, while in some the colour is distinctly marked. A small-pox-like eruption is occasionally seen, but has not the shotty feel.

Respirations are increased to thirty or more. Percussion shows a little hyper-resonance. The respiratory phenomena look like that of hæmorrhage—probably due to the destruction of red blood corpuscles by the spirilla. Similar breathing is noticed in pneumonic plague.

The pulse is always rapid, about 100, but good. The heart-sounds are feeble, but not so feeble nor obscure as in plague. Percussions over the heart show that the cardiac dull area has diminished, while in plague it is increased from dilatation.

The appetite is poor. Vomiting is a rare symptom. In one case it was very marked. Vomiting of blood occurred in one case. Constipation is usually present, and if a purgative be given the stools do not smell as in typhoid. Large doses of calomel do not induce diarrhœa. The motions are dark-coloured (iron-laden stools), probably due to the destruction of red blood corpuscles. Distention of abdomen is a very rare symptom, unlike typhoid. Assimilation is very poor. The patient becomes markedly emaciated even in one week, in spite of careful nursing. The spleen is enlarged and very tender, as also the liver, but not to the extent of the spleen, and is less tender. Tenderness of spleen is prominently marked in all cases. General glandular enlargement is a rare symptom. The tongue shows irritation. It is thickly furred and moves less freely, resembling a "liver" tongue. Such a tongue is seen in

cerebro-spinal disease. The tongue at once makes one suspicious of plague, but it is not so foul. It shows that the patient must have been ill for two or three months, although he may have been ill only for two or three days. It gets worse and worse in spite of treatment. By the last two days the tongue becomes small in mass, dry and leathery. The teeth become dry and sordes collect on them, and the look of the face is like that of a cadaver.

Urine is very red and of high specific gravity. Traces of bile are present, chlorides are less.

Intelligent people complain of pain in the epigastrium, while dull people say they have the pain in the abdomen. Pain in the calves is a very prominent symptom, and present in one and all cases. Pain all over the body is complained of, but it is more in the muscles and tendons than in the bones. The pain is more marked in the anterior parts of the body—with the exception of the calves—and the flexors. There is no severe pain in the head, as in typhoid fever, nor is there any pain in the back-bone and neck, as in cerebro-spinal fever. The patient does not sleep during the period, in spite of big doses of opium. He is neither delirious like a typhoid patient nor dull like a plague patient. The mental power is clear, but the calculating power of the brain is affected.

The muscular power is reduced from the commencement. He cannot even sit for any length of time, but, unlike a plague patient, he can walk straight.

In spite of treatment the patient gets worse and worse, and towards the end of the fever the typhoid state is pronounced. Suddenly, on the seventh, eighth, or ninth day the temperature falls to subnormal, either with profuse perspiration or with diarrhœa, or with vomiting of blood, or epistaxis. While the temperature is going down the patient asks for food. The jaundice remains behind for a week after the fever has fallen to subnormal. In the interval after the fever the patient seems well. He eats greedily and seems to make up for the loss of food in the week previous. He does not complain of any pain or any after effects (except jaundice). The only symptom that remains behind when the fever has left is jaundice, and especially when it has been marked. He gets good sleep. The motions become yellow. The spleen becomes small.

After five, six, or seven days the patient gets fever again with all the previous symptoms. This relapse is mild in many cases. People who develop jaundice, or who vomit blood during the first attack get the relapse in severe form. The jaundice is intensified, the secretion of urine becomes less, and more blood is vomited. The urine contains blood during the relapse. Even these cases recover splendidly provided they are not actively drugged. The people who pass blood are "bleeders" generally, or, as they say, their wounds take a long time to heal. The relapse is short, *i.e.*, it lasts for four or five days only, and the patients bear it better than the first attack. Rarely a third attack is noticed.

Out of 500 cases one case died of suppression of urine, two from exhaustion, one from meningitis, and two from heart failure.

DIAGNOSIS.

A poor patient comes to a doctor with pains in the abdomen and calves, and with jaundice. History shows sudden accession of fever without shivering and occurrence of similar cases of fever in the neighbourhood.

This fever is not malaria, because quinine in very big doses has no effect and patients do not shiver.

It is not plague, because almost all patients recover, there are no buboes, and the fever is less.

It is not rheumatism, because the pain is in muscles and tendons, and salicylate and alkalies have no effect on its course, and there is no swelling of joints.

It is not typhoid, because the duration is only seven days; the characteristic headache and slow pulse are wanting; there is no diarrhoea. Chlorine mixture seems to do harm in this disease.

The diagnosis is very simple if microscopic examination of the blood is made.

TREATMENT.

The fever runs its course and defies all methods of treatment. The less active medicinal treatment you give these people the better.

Opium in pill form, pushed to produce pin-point pupil, does some good.

Quinine in 5 gr. doses keeps a check on the peculiar "air hunger" respirations. Patients getting quinine have better pulse than those taking diaphoretics. The motions are less coloured under quinine. The relapse is more marked in patients who take quinine during the first attack.

All antiseptics seem to do harm in this fever.

Diaphoretic treatment is exhausting.

Cold water baths are very beneficial. Still, under cold baths the tongue does not improve as it does in typhoid; but the "air hunger" respirations diminish. The urine is improved by baths.

Food consisting of fresh fruits, especially oranges in abundance, fresh milk, fresh mutton broth with plenty of salt, and green vegetables is the proper diet. Alcohol seems to do harm in this fever; even the worst cases recover without a drop of it.

Nothing active should be done for the jaundice. Fomenting over the liver for pain does harm. Vomiting is not amenable to any treatment.

To check the relapse residence must be changed at once. Fruits, port wine and plenty of common salt help to render the relapse less severe.

THE ANATOMY OF THE BITING FLIES OF THE GENERA *STOMOXYS* AND *GLOSSINA*.

By Lieut.-Colonel G. M. GILES, I.M.S. (Rtd.).

(Continued from p. 202.)

The heart lies almost free in the pericardial cavity; but is, nevertheless, firmly supported by muscular bands, the alar muscles described by Prof. Minchin, but these seem to me quite distinct from the strong antero posterior muscle which forms a part of the pericardial septum, and which, to judge from his plate lxx. is the structure so named by Lowne in his book on the blow-fly.

This latter structure is well represented in both *Stomoxys* and *Glossina*, and does not appear to me to have any direct connection with the heart at all, and is certainly not the same as the structures referred to under that name by Prof. Minchin, which seem to have a much better claim to be so called. The muscle of the septum is a very well marked structure, broad in front and narrow behind, and is somewhat fan-shaped. The more internal fibres soon join with those of the opposite side under the first two chambers of the heart, while most of the rest extend the whole length of the septum, of which they form a considerable portion of the substance. The septum, is, however a very complex structure. It is lined with a distinct layer of pavement, endothelium (*vide* pl. i., fig. 12) and there are said to be pores in it, whereby the pericardium communicates with the general body cavity. Besides this there appears to me to be a delicate but perfectly regular layer of unstriated transverse fibres. Its lateral attachments to the terga are embedded in thick masses of the fat-body. The fat-body appears to correspond to the "cellular" tissue of vertebrates, and forms the packing of the organs not only about the septum but in every other waste space of the body. It is composed of enormous cells which appear to be usually multi-nucleate, but as a rule, it is not easy to distinguish the limitations of the component cells. The protoplasm (as shewn in pl. i., fig. 13), is vacuolated, the spaces, in specimens that have not been treated with solvent reagents, being occupied with a reserve store of nutriment.

Besides the structures already enumerated as entering into the formation of the pericardial septum, there are two distinct sorts of cell which have been indifferently referred to by authors as "pericardial cells." One category of these (pl. i., fig. 14) are undoubtedly nothing more than young mononuclear fat cells, their protoplasms having exactly the same structure as the cells of the fat body. The others are very different and are multipolar cells (pl. i. fig. 15), the poles of which, according to Lowne, are muscular fibres. These form a network over especially the lateral parts of the septum, and look exactly like ganglion cells, though it is not suggested that they are of that nature. In studying the literature of the subject it is well, however, to remember that either of the above forms of cell may be referred to by a writer, as the obvious discrepancies between their descriptions are otherwise very confusing.

As far as the writer can see, Lowne's theory that the dorsal vessel is a hollow muscular fibre is a quite accurate description of the thoracic aorta, as it seems to consist of a single row of long cells, the sides of which curve upwards to meet in the middle line above. The protoplasm, with the nuclei of these cells, forms a continuous thread in the middle of the ventral wall of the tube, lying in contact with the dorsal wall of the gut, while the lateral prolongations, which form the walls of the vessel, are extremely thin and delicate. The lumen of the tube is triangular with the apex dorsal and the flat base ventral, so that it fills up the interstice between the gut below and the lowest pair of great longitudinal thoracic muscles, and is padded on either side by rows of fat-cells.

The generative organs.—These in all Diptera, and in both sexes, consist essentially of a Y-shaped tube, the branches of which lead up to a tract of generative epithelium. Into the point of meeting of the arms of the Y, there enters, in each sex, a pair of accessory glands, so that it would be, perhaps, more exact to describe the agygos reproductive duct as dividing into four follicles; as morphologically it seems probable that the reproductive and their accessory glands may be of the same value. In the male these glands are usually spoken of as the vesiculæ seminales, but the term is an entire misnomer, as they secrete a milky coagulate fluid which mixes with the semen in the common sperm duct, but never contain spermatozoa. Structurally they closely resemble the parovaria, or corresponding accessory glands of the female. In *Stomoxys*, however, the usual arrangement is considerably modified, as the paragonia only exist as separate lateral organs for a fairly short distance as a pair of diverticula and then unite to form a single tube which, for the greater part of its length, seems quite without convolution, and runs beside the ejaculatory duct to its point of union with the common sperm duct, which immediately after divides into three—the lateral branches or vasa differentia (efferentia of Lowne) looping backwards to the testes, while the median extension widens to form a rudimentary ejaculatory sac, which, however, has neither the muscular loops nor the fan-shaped sclerite which make it such a prominent organ in the blow-fly.

The ejaculatory duct is so small in comparison with the paragonium which lies beside it that it is very

ragged outline. The paragonium is a peculiar structure, as the lumen of the tube is surrounded by a trabecular structure, the interspaces of which are filled with a granular material. The trabeculae radiate towards the lumen, and so have a superficial resemblance to columnar epithelium, but though I have stained them in various ways, and the lining of the ejaculatory duct lying close by has the nuclei of its epithelia quite distinct, I have never seen any structure in the granular substance which could be regarded as a nucleus, while the trabeculae are distinctly nucleated, especially at their internodes. On this account I prefer to consider the granular substance as intercellular. The testes are two small bodies enclosed in a sac formed of flat, deeply pigmented epithelium. In mature insects it is almost entirely filled with spermatozoa of enormous length, but in young insects trabeculae of father cells project into the interior, and there may be but little ripe sperm.

The stages of the spermatogenesis seem to be quite normal and have been described *ad nauseam* by many writers. All these structures are imbedded in a dense mass of fat-body, and in front lie beside the rectum. A rather complicated system of muscles come into view in the hindmost sections of a series which actuate the rather complicated external genitalia. For most of their course the ejaculatory duct and paragonium run rather above the longitudinal axis of the insect, but as they approach the hypopygium bend sharply down to the venter.

The female generative organs are quite of the usual dipterous type, each insect producing in the course of a season an immense number of large oval eggs.

These eggs during their development lie more or less in rows of about four ova of various stages, and it is usual to speak of these rows as "ovarioles," but the cavity containing each ovule is just as separate from the more and less developed ovules below and above it respectively, as it is from those of similar development surrounding it, and the separation in both cases consists of an open stroma of muscular fibres without any definite intima or epithelial lining, so that fundamentally their structure is the same as that of the mammalian ovary with which human anatomists are familiar. The general arrangement and relations of the ovaries may

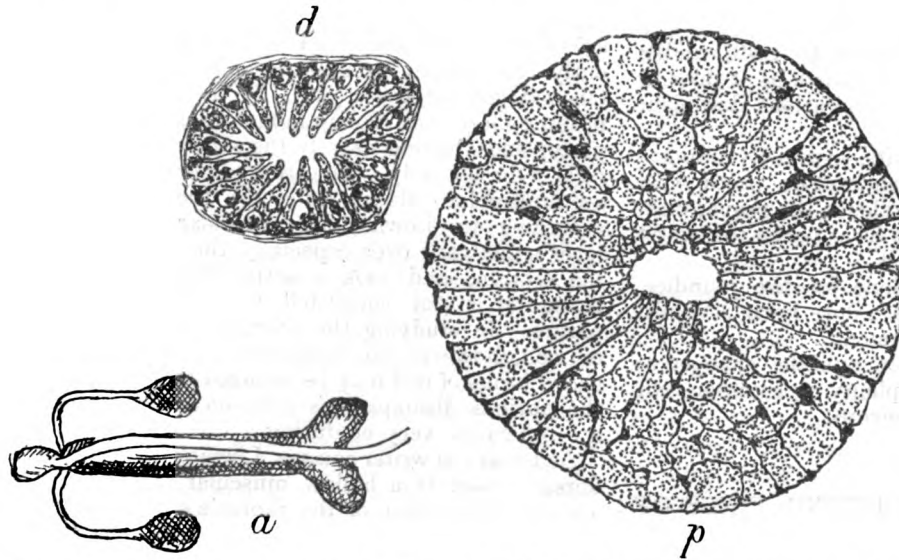


FIG. 33.—*a*, diagrammatic representation of male internal generative organs; *p*, transverse section, paragonium; and, *d*, transverse section, ductus ejaculatorius, $\times 400$ diams.

likely to be overlooked in dissecting, and the paragonium mistaken for it, as the latter is 0.15 mm. in diameter, while the ejaculatory duct is but 0.05. The duct, vasa differentia and ejaculatory sac are of exactly similar structure, being formed of a structureless intima, lined with conical epithelial cells, the apices of which project into the lumen so as to impart to it a

be gathered from the following figure, which includes also a diagram of the ovipositor copied from Lieut. Tulloch's paper.

The lateral oviducts, too, cannot be said to expand into a funnel-shaped receptacle receiving the ovarioles, as it seems rather a portion of the general body cavity into which the branches open, which latter receive the

ovules after the dehiscence of the muscular alveoli in which they lie, and to which they are guided by a continuity of the muscular structure of the ovary with that of the wall of the oviduct.

The smallest germ cells are multinucleate masses

surrounded by a capsule of small cells. The next larger form (*b*) has two nuclei, and spring from a small celled mass on one side, while on the other the capsule is lined with large columnar epithelium, from which is developed the chorion which forms the shell of the full grown ovule (*c*). In the less mature eggs the chorion is still recognisable as a lining of flat cells (*d*) within the shell, but in those ready to pass into the oviduct it is difficult to distinguish this membrane. In ovaries in a certain stage of development before the chorion has changed into egg-shell, it is easy to mistake it for an epithelial lining of the ovariole. The eggs (*c*) are elongated ovoids having at their upper end an infolding of shell and chorion which leads to a minute canal, the microphyle, passing to the interior of the ovum to give passage to the sperm cells of the male. The stroma separating the ovarioles consists of elongated spindle cells containing each a row of nuclei. In (*e*) these muscle cells are represented in the inter spaces between three contiguous ovarioles. Under a high power it can be made out that the egg-shell is fibrillated, or striated vertically to its surface. Towards the end of the common oviduct there opens into it the two accessory glands (parovaria), and the ducts of the three spernothecæ.

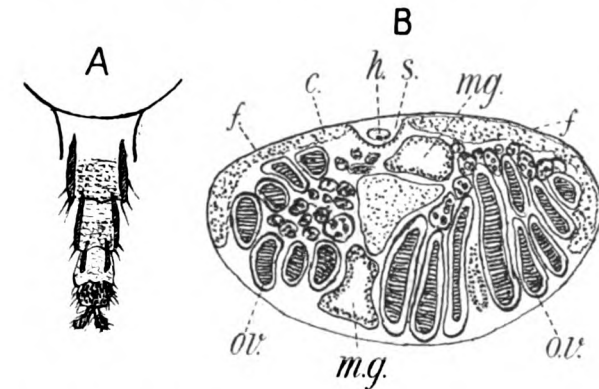


FIG. 34.—A, diagram of ovipositor, after Tulloch; B, transverse section of abdomen of gravid female; c, crop; f, fat-body; h, heart; mg, mid-gut, $\times 28$; ov, ovules; s, pericardial septum, $\times 20$.

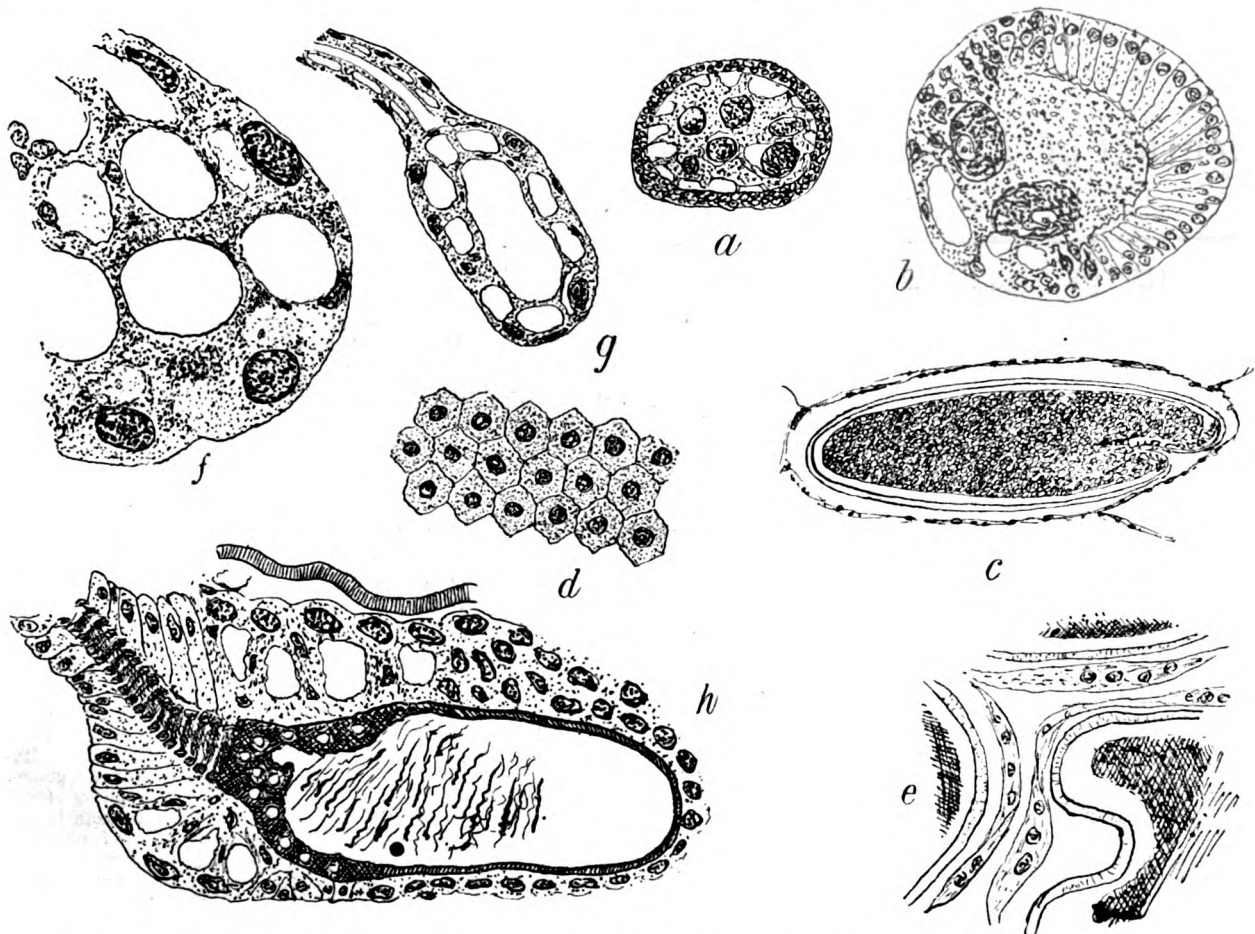


PLATE II.—a, Young ovariole, $\times 270$; b, ovariole further developed, $\times 270$; c, fully developed egg in its alveolus, $\times 50$; d, portion of chorion or lining membrane of egg shell, $\times 270$; e, muscular stroma separating three ovarioles, $\times 270$; f, portion of parovarium, $\times 540$; g, the same and its duct, $\times 270$; h, section of one of the vesiculæ seminales, $\times 540$.

(To be continued.)

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THE

Journal of Tropical Medicine

JULY 16, 1906.

METEOROLOGY FOR AMATEURS.

INSISTENCE and repetition can never be fairly deprecated in a good cause, and hence we have no hesitation in returning to our contention that an immense amount of good work might be accomplished by Europeans whose business takes them to out-of-the-way parts of the world which, though fairly known from the point of view of the traveller, are as yet quite unexplored regions to the meteorologist.

The subject forms a most interesting hobby, and can be pursued at so small a cost that the consideration of expense need hardly be a bar to anyone, as a set of thermometers, a rain gauge, and a wind-vane are all that are really necessary to afford all the information essential to a preliminary survey.

A set of maximum and minimum thermometers, wet and dry bulb of each, can be got for under £2,¹ and a rain gauge for about 15s. more, so that the whole cost of a reliable outfit need not exceed £3.

Maximum and minimum thermometers, manufactured for popular use, can, however, be obtained for a few shillings, and by comparing these with an accurate instrument, and tabulating any errors they may show, they are easily available for more exact work, or a corrected paper scale may be pasted over that furnished with the instruments.

¹ A set of such instruments were supplied to the writer by Gallenham and Co., for £1 18s. 8d.

All that is necessary is to plunge each instrument along with a standard thermometer into water warmed to near the highest point of their scales, and to take simultaneous readings as the water cools.

A rain gauge may be improvised by utilising a large glass funnel for the purpose, and mounting it on a bracket, so that its tube discharges into a glass tube of a conveniently smaller diameter, say about $\frac{1}{4}$ th, and of sufficient length to accommodate the largest rainfall likely to require measurement in twenty-four hours, so that in a region where six inches of rain is a possible experience the tube would require to be 30 inches long.

The arrangement is represented in the subjoined figure, and is so constructed that only the bare edge of the funnel projects above the round hole in the bracket that carries it, and the remainder of the funnel is protected by a piece of tin rather deeper than the cone of the funnel nailed to the edge of the bracket.

This is necessary to prevent driving rain from striking the outside of the funnel and running down its surface into the measuring tube, which latter stands in a small hole in a lower bracket, while its upper end is held by a small brass spring clip, so that it can easily be slipped out of its supports to empty it.

Remembering the familiar formulæ that the area of a circle is πr^2 , it is easy to calculate the volume of water corresponding to one-tenth of an inch of rain falling on the exposed mouth of the funnel, and by pouring into the tube successive measures of water of this amount, and marking the level on a strip of paper pasted to the tube, it is easy to graduate the latter to tenths and inches, while the cents can be put in by means of a proportional divider.

After graduation the paper should receive two or three coats of varnish, and the apparatus will then be ready for use. The writer had a gauge constructed at home on this plan in use for several years, and found that it registered quite correctly when placed beside an instrument of the orthodox manufacturer's type. The lower end of the piece of plank supporting the brackets that carry respectively the funnel and measuring tube, is prolonged into a conical point which can easily be thrust into the ground in any suitable situation.

A wind-vane is even more easy to construct. All that is required is a vertical rectangular loop of stout brass wire, the arms of which are bent to form horizontal eyes, through which is threaded a somewhat stouter wire which is fixed into the end of a pole long enough to elevate the vane above any neighbouring

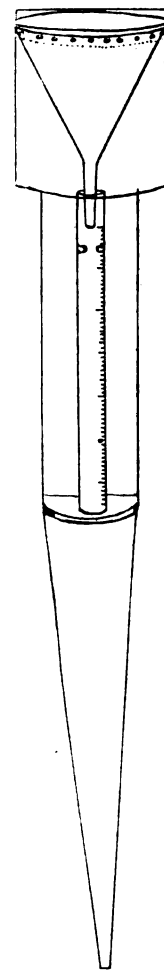
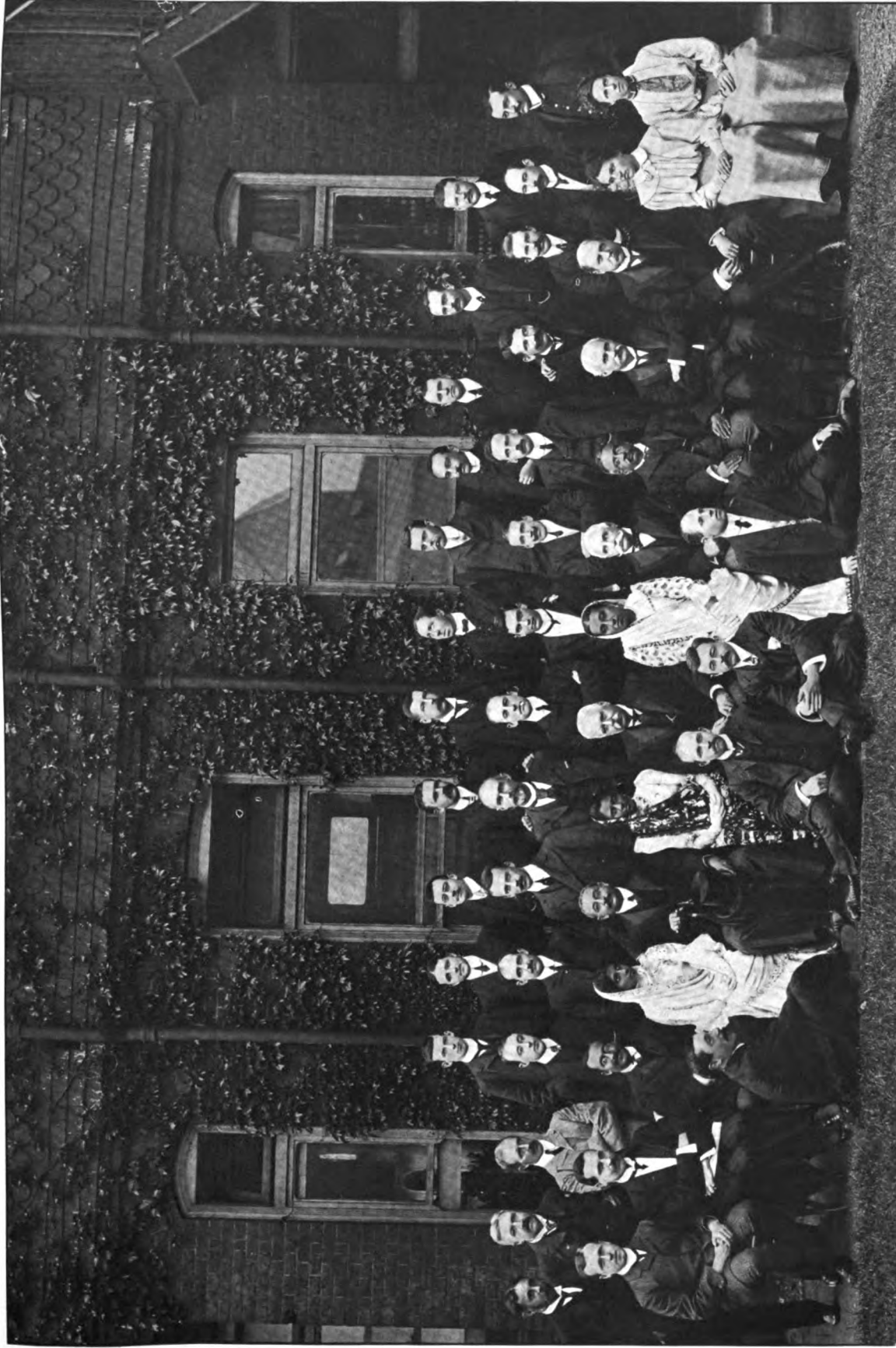


FIG. 1. — Improved rain gauge. The piece of tin that protects the funnel from drifting rain is represented as if transparent.



Back Row: A. Reid (Junior House Surgeon), W. Smith Allan, A. Ingram, H. L. Deck, Mr. H. C. Standland Smith, A. B. Tighe, Capt. E. L. Perry, I.M.S., E. Robledo, G. B. Warren (Laboratory Assistant),
 3rd Row: Dr. C. W. Daniels (Medical Superintendent), J. Ottley (Staff Surgeon, R.N.), A. E. Ridsdale, W. M. Wade, Capt. L. P. Stephen, I.M.S., Capt. F. N. White, I.M.S., J. J. Zellweger, J. McW. Bouke,
 J. P. Zervogel, Capt. A. W. Cook Young, I.M.S., B. M. McVail (Senior House Surgeon), Capt. L. L. G. Thorpe, R.A.M.C., R. T. Booth, J. Cross, G. Portoli-Rocca,
 2nd Row: A. T. Stanton (Demonstrator), Dr. F. E. Fremantle (Lecturer), Dr. B. S. Postwalla, Miss Dinbai Furdooji Petit, Mr. Jehanji Bomanjee Petit, Mrs. Manekbai Bomanjee Petit,
 Sir Patrick Manson, K.C.M.G. (Lecturer), Mrs. Goolbai Bomanjee Petit, The Hon. Bomanjee Dinshaw Petit, Dr. F. M. Sandwith (Lecturer),
 Mr. P. Michelli (Secretary), Miss K. Wyss, Miss L. G. Thacker,
 Front Row: Major E. Wilkinson, I.M.S., H. W. Kirby, H. P. Kennard, E. N. Graham.
 Absent—E. C. Peake.

LONDON SCHOOL OF TROPICAL MEDICINE.

21st Session. May-July, 1906.

obstacles, as in fig. 2. To the vertical piece of the loop is sewn a small pennon or burgee, and the points of the compass should be indicated by pegs driven into the ground around the base of the pole. In recording, it should be remembered that the burgee will point in the direction opposite that from which the wind is coming.

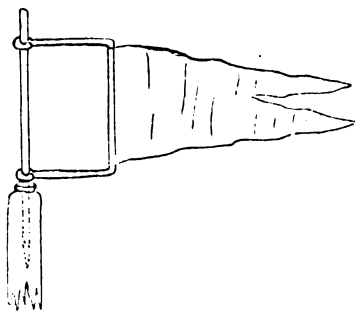


FIG. 2.—Improved wind vane mounted on a pole.

The thermometers should be mounted on a board nailed at the level of the observer's eye to the middle pole of a small mushroom-shaped thatched hut, supported on poles about 5 feet high, but quite open at the sides; and if this be made to cover a sufficient area, requires no "screen," though it is desirable to have one, especially in dusty localities, in order to protect the muslin enveloping the wet bulbs.

That no special scientific training is needed for the pursuit is shown by the fact that excellent work is done in India and other parts of the world by natives boasting of but little education, and the time that need be devoted to it is very small, as, with the system advocated in a previous article, of a single daily observation of maximum and minimum wet and dry thermometers, punctuality of observation is by no means essential, as the observation may be taken "then or thereabouts" at any convenient time of the day.

We would commend these brief notes on this subject especially to the graduates of the Livingstone College, for no body of men penetrate further beyond the bounds of civilisation; and being usually fairly stationary, they are better situated for work of the sort than are Government officials, who are usually moved too frequently from place to place to make continuous observation possible; but commercial men are sometimes equally well placed, and would, we venture to think, find an interesting relaxation from the worries of trade in wild parts of the world, by contributing to our scientific knowledge of their places of residence on this highly important subject.

LIVINGSTONE COLLEGE.

COMMEMORATION day was celebrated by a meeting in the grounds of Livingstone College, on Thursday, May 31st, Mr J. A. Simon, M.P., in the chair.

The Principal, Dr. C. F. Harford, read a brief statement with reference to the progress of the College.

In the course of his remarks, Mr. Simon said: We are, unfortunately, in this country, at this moment in a controversy about some branches of education—a

subject beyond all doubt controversial, and it is therefore a great satisfaction—I hope I may say to all of us—to find that in coming here we meet, not only on common ground in the sense that we are in the spacious grounds belonging to this place, but we meet on the common ground of a common belief in the worthiness of the object, and the excellence of the method by which that object is being carried out in this place. I am sure it is a satisfaction to feel that there are still some important matters of educational life on which we can all agree.

As I understand it, this place does not claim to turn out medical missionaries, but it holds that no man or woman can serve in that high and noble office unless he or she has a knowledge of things medical such as make a part of a good education in those who are determined to learn what they should know. It seems an extraordinary thing that a man or woman, though this institution is as yet confined to men, that a man or a woman who is prepared to devote his or her life to this high calling, with no thought of drawing back in the face of danger, should go out to places, far away it may be from medical aid and from protections from disease, without such protection as a place of this kind can afford. It strikes one as startling that, as we have been told by the Principal just now, though this place has been doing its work well for many years, the great service which it could do to a large body of men and women going to the mission field is not taken advantage of by the great missionary societies to the extent one would expect. As I understand it, the people who come to this place come here primarily in order to learn how to protect their own lives and the lives of those nearest and dearest to them in the work they have undertaken, and the man who does not do that is as bad as the man who does not insure his life when he is going to be married.

I feel certain I am expressing what is in the mind of you all when I say that work such as is done here is work in which we may claim Livingstone's spirit is amongst us, and in commemorating on this day the good work of Livingstone College during the past year we are preserving and maintaining the tradition which that good man and that well-trained doctor, combined with such magnificent effect and example for all time in Africa.

Mr. James Cantlie, F.R.C.S., said: It is now thirteen years since Livingstone College was founded, and some 250 students have passed through its portals during these years, and gone into the mission field better equipped for their work than they otherwise would have been. Alas, only 250 students in thirteen years; and when we consider how many thousands of missionaries have been sent out from this country, it is evident that only a handful have been trained here. We all admire missionaries, we all esteem the man who has devoted his life to the cause of Christianity, and his efforts, it is hoped, will go on as long as our race retains its virility. The missionary takes his life in his hand when he goes forth to do his work, and comes back, perhaps, with his health shattered, or perhaps he dies at his post. For the missionary to die for Christianity is a noble end, but there is still a nobler aim—he might live for Christianity, and this College exists for the purpose of

teaching men how to live for Christianity. The work which is carried on at Livingstone College I think most of you know, it is not you who have to be told, it is the stranger without the gates. I feel rather in the position of a clergyman lecturing his congregation to be regular in their attendance at church and to be liberal in their giving; it is not to them he ought to talk about not coming to church, it is the people who do not go to church he should upbraid and remonstrate with for their niggardliness in giving. The work that is being done at Livingstone College is this: Missionaries who have gone through a course of theology for three or four years come to this College for nine months—they often come for a much shorter time—but some come for nine months, and they come to get instruction in elementary medicine, surgery, and hygiene. It really should be called by a term which is familiar to you all, “first aid” in medicine, surgery, and hygiene. You are all familiar, or ought to be, with how to render first aid to the injured; many of you have, no doubt, been through the St. John Ambulance first aid course. What were you taught? You were taught elementary anatomy and surgery. Some say you were taught a little knowledge, and a little knowledge is said to be a dangerous thing, but the instruction you were given was complete and exhaustive of its kind. It is a distinct branch of surgery and medicine, and therefore do not go away with the idea it only teaches you “a little knowledge,” for it completely fulfils its purpose. A course of the kind would not be of direct use to you were you required to render first aid to persons suffering from disease in the tropics. Here in Britain, in our factories and workshops we find accidents are part and parcel of our daily life; street accidents occur every day. When one goes to the tropics, one finds that there are, in many places, no horses, no vehicles—if you go to South China, for instance, there are no railways, no factories, no horse vehicles, everything is carried on men’s shoulders, so that there are no “accidents” such as we meet with here, and therefore it is not sufficient to be trained in merely “first aid” work which we require at home; it is not the kind of first aid that is essential there. What is required of a missionary in warm climates is to know how to deal with the sudden onset of diseases, which destroy life almost as suddenly as a railway engine may in this country. The disease comes suddenly, its course is short, and the patient may die, it may be, in a few hours. It is to teach men how to render first aid in some of the terrible maladies of the tropics that is the aim and object of Livingstone College, and it is necessary for missionaries to know something of this branch of medicine. Most clearly is it necessary, for the missionary is often looked upon by the natives as a “medicine” man, the reason being that most of the white men who first appeared as missionaries had a knowledge of medicine. Livingstone is responsible for that in Africa; his reputation as a medical man was great, and when the people saw him they knew he was capable and willing to administer relief to the suffering. Now when we send out our missionary he is looked upon as one who knows something of medicine, in the first place, from the very fact that he is a white man; and in the second place, seeing also that he

is a learned man and religious, he is believed to possess the attributes all natives are accustomed to associate with religious teachers, namely, the power of healing.

WHAT IS REQUIRED OF THE MISSIONARY.

A hundred years ago the priest or minister in this country was sought after by people in illness, and it was frequently part and parcel of the work of the clergy to administer to the body as well as to the soul. The same idea prevails throughout the length and breadth of Asia, Africa, and many parts of America to-day; the missionary is looked upon as a “medicine” man, and therefore how very necessary it is that the missionary should have a knowledge of the healing art. In the earliest days of Christianity we know the part, the vital part, the cure of disease played, and amongst the more primitive peoples of the world to-day the same part is expected of us. Any one familiar with the terrible epidemics which afflict humanity in tropical countries, with the suddenness of the attack and the fatal nature of many of the diseases, can well understand the desire of the natives to be saved and protected from the virulence of their scourges. This prayer of the natives for relief from suffering and from the illnesses which at times almost annihilate their tribes is a natural, a human cry, and it becomes us to treat it humanely. To these plague-stricken peoples we send in our charity missionaries; men and women anxious and willing to devote their whole time and even their lives to benefit the souls of our unenlightened fellow-beings. A noble object, and one worthy of our support, but there are means by which this excellent work can be more efficiently carried out than it is at present, and it is to provide these means that Livingstone College was called into being. Health is the handmaid of religion, and the Saxon word “heilig,” which we translate “healthy,” might be as correctly transcribed “holiness.” The missionary sent out with no medical training is not to be envied. He may find the people around him dying of ailments which, for lack of even elementary knowledge, he can do nothing to alleviate. He can have, owing to want of instruction, no confidence in himself, and therefore cannot inspire confidence in others. The effect of such a position upon the mind or conscience of the missionary it is not pleasant to contemplate; in the name of common humanity he does his best, but his best is unskilled labour, because he is untrained, and the situation comes home to him with heartfelt regrets that he was sent out, or, that he elected to come out from home, ignorant of even the elements of medicine or surgery. Who is to blame if the missionary is sent out thus imperfectly equipped? Not the young man or woman who in the enthusiasm for the teaching of Christianity volunteered for the foreign field. The societies to whom we entrust our mission work are willing to take advantage of the enthusiasm of these young men and women, and all too frequently send them out imperfectly equipped, send them to their death in many cases because their religious fervour was not tempered with practical wisdom. The recruiting ground for missionaries is not illimitable; we are drawing upon our population in many directions for the sake of empire, and with the advance of time and opportunity more and more mis-

sionaries will be required for mission work ; it behoves us, therefore, to conserve our voluntary workers in the good cause, and to see to it that their lives are not needlessly thrown away.

"DO THE MISSIONARY SOCIETIES FULFIL THEIR DUTIES?"

Now, all this work cannot be carried on without money. Many millions are contributed yearly by the people of Britain for the missionary cause, and as Christianity spreads in heathen lands yet more will be required. The immense sums of money we contribute are greatly to the credit of the people of this country, and more will no doubt be forthcoming as it is required. The moneys we contribute are paid into the exchequer of the several missionary organisations, and to them we look to see that this money is rightly spent. Let me say at once that the missionary societies which send out their missionaries without granting them the opportunities of—nay, insisting upon—learning something of medicine; surgery and hygiene are not fulfilling their trust. They are juggling with the lives of men and women in a manner which, did the people in this country appreciate it, would lead many charitable persons to close their purses with a snap, and to say, "I will contribute no more until you mend your ways." I should like my words to reach the ears of all the authorities of these societies, as well as those of the public who contribute the money. It is difficult to do that, however, by speaking or writing mere platitudes; it will require a "scene" of some kind before the public can be aroused to the situation; it would require someone in church, when on the next occasion money is being asked for missionary societies, to stand up before the collection is made, and to say, "Sir, are the missionaries you intend to send out, with the money we are willing to contribute, to be properly equipped for their work by being trained in elementary medicine and surgery? because if not we will take no part in encouraging these estimable men and women to go to their death." Could someone be found to have the courage to do this the matter would be settled for ever; no money would be forthcoming to societies who betrayed the confidence the public place in their work and methods. Surely this very humane work can be done without some such vulgar appeal to unruly sentiment. Surely it is not necessary to have scenes in church to rouse the public conscience in regard to the lives of missionaries. The missionary societies are not so numerous but that they cannot be appealed to individually; and, although we are told a committee has no conscience, the men on these committees are sensible Christian men, and the fact that they are dealing with the lives of men and women must surely come home to them.

LIVINGSTONE COLLEGE THE EUROPEAN CENTRE FOR TRAINING MISSIONARIES IN ELEMENTARY MEDICINE.

I have spoken strongly on this subject because I feel strongly; and had I more power to deal with the matter I should not rest until I had made it compulsory by law that no missionary leaves these shores for work in the tropics until he can satisfy the charitable public that he is properly equipped for the

task. The lives of the missionaries are as much a national asset as the lives of the men who go into the public services or join commercial firms; and just as government servants and merchants are necessary for our imperial wants, so are missionaries necessary to fulfil the desires of the people of this country that religious teaching shall be given to the heathen!

Attempts at teaching some elements of hygiene are made elsewhere than at Livingstone College, but at this college alone is a systematic course given which is calculated in any way to meet the objects in view. As usual, we are slow in this country to entertain or to act upon a new idea; not so some of our Continental neighbours, and several of the western European nations send their missionaries to be trained at Livingstone College.

DO NOT BE IMPATIENT WHEN THE NATIVES HESITATE TO ASK YOUR ADVICE.

I would like to give a word of warning to young missionaries. Do not be disappointed if you find the natives inclined to "stand off" at first. You may think it ungrateful of them not to trust you at once and to be unwilling to place their lives in your hands. Here in England we do the same thing, we stand off a bit, to see what the new doctor is like, and so you cannot blame these people if they do not throw themselves at once into a recently-arrived doctor's hands. But when you gain their confidence the "medicine" man is to the natives supreme. I remember in Egypt during the cholera expedition of 1883, when I happened to be one of the men who volunteered for service, I went to a village where I was told there were numbers of people dying, but I could find no cases. I searched about for two or three days, but could not find any evidence of cholera, and I telegraphed to the authorities in Cairo: "I am sorry"—I should have said, I suppose, I was glad—"I am sorry, but there are no cholera cases here." At last one of the Egyptian soldiers who accompanied me in my rounds began to trust me, and he took me to a house where he knew there was a case of cholera. I went with him to the door, and there was the mother of the lad who was said to be ill with cholera, standing at the door, and declaring there was no case of cholera in the house. We pushed past her, and we searched everywhere for that patient. It was not a large house, we soon went all over it, but there was no sign of a patient. At last under some hay in front of the buffalo I saw something move, and gathering up the hay I found the sick lad. The patient recovered, and then I began to get cholera patients in scores. Within twenty-four hours I had 200 patients. The people thought that the British Government intended to punish them; we had been at war with them in 1882, and they thought we were sent out in 1883 to complete the destruction of the country and the people. That was the light in which the doctors were looked upon, and one can scarcely wonder at the backwardness of the people to accept our services.

Again, do not be too ready to come to the conclusion that there is no such thing as some particular disease in a district because you have not seen it. You may say to yourself:—"I cannot find any of these diseases I was taught so much about at Livingstone

College, and I do not believe they exist in my district." I remember two instances with regard to myself. I had been five years in China before I saw a case of elephantiasis, and I was very disappointed, as I was led to believe I should see many cases of this nature. However, one day a man with elephantiasis came to be operated upon; he recovered, and after that I had many cases. In the same way, I was going to report to the medical papers that women in China did not suffer from internal tumours as they did in Europe, seeing that in five years I never found a case. After operating upon one successfully, however, I began to think they were quite plentiful. So I advise the young missionary not to be disappointed because the people do not come to you at once; you must first gain their confidence, and you can do so if you go the right way about it. Livingstone was an example of the power of this quality, even to the extent that when he moved to a fresh place the people frequently went with him.

Were the necessity, the vital and imperative necessity, for all missionaries having some knowledge of medicine and surgery and hygiene thoroughly appreciated, I am sure that there should be no doubt about the future of Livingstone College.

I have gone carefully into and considered what is being taught here, and you will find that it has the entire approval of the medical profession. Of course, objections have been raised, and people have said "you are training men for doctors." When the St. John Ambulance Association began its First Aid training people said the same thing. That dread has long since disappeared; all medical men approve of First Aid in our streets, and how much more is it necessary when going to parts where there is no doctor, that teaching suitable to those far distant places should be insisted upon. I should like to see it made law, and an embargo put upon every ship embarking a missionary who has not been adequately trained. Unless it is made law, I am afraid that religious fervour may carry us away, and men and women will still be sent out without being fully equipped; they should be trained to look after their own lives, the lives of their colleagues, to help the people, and not needlessly to lay down their lives in those distant lands.

APPENDICITIS.

THE alleged causes of appendicitis multiply. Quite recently at least three new conditions associated with this ailment have been mentioned. (1) In the *Lancet* of February 10th, 1906, E. Burfield and E. H. Shaw found in a patient from South Africa lumbar and gluteal abscesses which showed ova of bilharzia in the appendix. Their belief is that the pus from the appendix pointed backwards and upwards posteriorly, and that along the sinuses thus set up bilharzia ova found their way into the appendix. (2) H. H. Roberts, in the *New York Medical Journal* of February 7th, 1906, mentions intestinal oxyures to be one of the chief causes of appendicitis and colitis. (3) A. A. Gumbines, in the same journal, mentions a case of tapeworm in which the symptoms pointed to appendicitis, but completely disappeared when a tapeworm was passed.

ECHINOCOCCUS MULTILOCULARIS.

W. RAMSAY SMITH, of Adelaide, South Australia, in a graduation thesis published in *Medicine* in October, November, and December, 1905, deals with multilocular hydated cyst. After discussing the modern views of hydated disease, he proceeds to a historical and descriptive account of the multilocular variety. Dr. Smith states that "the total number of multilocular hydatids hitherto recorded throughout the world in human beings and the lower animals is under 100. The number of specimens I have myself collected is somewhat over 1,000." The specimens are largely collected from the lungs and livers of sheep; a few specimens are from oxen and pigs. The most typical form of multilocular hydatid consists of a number of "graded" loculi communicating with one another, and varying in size from 1 to 10 millimetres or more in diameter, with ectocyst and endocyst continuous throughout the loculi, the small loculi being barren, the large fertile, and are enclosed in a common adventitious fibrous capsule.

Dr. Smith describes a multilocular hydatid from the human liver. The tumour occurred in a patient dead of cancer, was of minute dimensions and calcified, but the cyst structure was evident.

In addition to the forms of multilocular hydatids hitherto described, Dr. Smith mentions a "tunneling" form. The liver in this variety showed large, tunnel-like excavations with diverticula, involving more or less of the organ.

Dr. Ramsay Smith states that "a typical echinococcus multilocularis is multilocular from almost the earliest recognisable cystic stage, and cannot, in the present state of our knowledge, be called merely a variety of any other form of hydatid."

BILHARZIA DISEASE AMONGST PORTO RICANS IN SAN FRANCISCO.

Six undoubted cases of bilharzia have been reported up to the present in the United States of America. All the patients were immigrants, and two of the cases were reported by Herbert Gunn in a paper read before the California Academy of Medicine, and published in the *Journal of the American Medical Association* on April 7th, 1906. Gunn's cases affected the intestines; all the previously reported cases had their seat in the urinary tract. The patients had left Porto Rico four or five years ago, went to the Hawaiian Islands, and had resided in San Francisco about twelve months. There seems no doubt that there is a focus of bilharzia disease in Porto Rico, but there is no evidence that the disease is endemic anywhere else in the American continent.

GOUNDOU AND AINHUM.

DR. WELLMAN ON GOUNDOU AND AINHUM.
GOUNDOU.

F. C. WELLMAN. In reviewing the causes of goundou (*Journal of American Medical Association*, March 3rd, 1906), Dr. Wellman, writing from Ben-guella, West Africa, mentions the several alleged causes of this condition. He notices the growths are

often considered : (1) to be a sequel of yaws (Chalmers); (2) a disease *sui generis* (Braddon); (3) an example of atavism in the negro (Strachan); (4) a manifestation of syphilis (Fredrichsen); (5) malformation due to non-union of the nasal and frontal bones (Kleng); (6) to be due to the presence of larvæ of insects in the nostrils (MacLaud). Dr. Wellman states that none of the explanations proposed rest on anything more definite than conjecture. The tumours are doubtless a hyperplasia, probably due to an osteoplastic periostitis due to a definite but undiscovered cause.

AINHUM.

The same author in the same communication criticises the theories appertaining to the cause of ainhum. The following etiological theories have been brought forward :—Ainhum is stated to be (1) a lesion of leprosy (Zambaco); (2) due to injury (da Silva Lima); (3) trophoneurosis (Scheube); (4) a circumscribed scleroderma (Corre); (5) a congenital spontaneous amputation (Proust); (6) the result of self-mutilation by ligatures, the wearing of toe-rings, &c. (Gongora and others). Of these theories Dr. Wellman thinks that of da Silva Lima is feasible. There can be no doubt that the affection is a cicatrix, and Dr. Wellman mentions a possible factor in establishing irritation in this part of the foot to be the chigger (*S. penetrans*), which has a predilection for the base of the little toe, especially if, as is so often the case, the skin at that spot be cut or torn. The true cause, however, of goundou and ainhum have yet to be discovered.

NOTES ON GOUNDOU AND AINHUM.

JAMES CANTLIE, M.B., F.R.C.S.

Goundou.—At the Seamen's Hospital, in connection with the London School of Tropical Medicine, I operated upon a case of unsymmetrical goundou in a European from the west coast of Africa. The man (36) had been since boyhood visiting the west coast of Africa, and had resided there for some twelve years, with occasional holidays. The enlargement was on the left side of the face in the neighbourhood of the nasal process of the superior maxillary bone, and projected sufficiently to cause a marked deformity. No cause was assigned by the patient for the condition, nor could any be ascertained from the history. I cut down upon the enlargement and removed the whole of the adventitious growth. The piece of bone consisted of a mass of rather closely packed cancellous tissue covered by a layer of compact tissue of normal consistence and thickness. No periostitis was discernible, and the fact that the growth was in the cancellous, and not in the compact, covering favours this view. The outgrowth in goundou would seem (1) to be due to an increase in the cancellous tissue of the nasal process of the superior maxillary bone in the first instance; (2) the neighbouring bones, namely, the nasal and (perhaps) the lachrymal, become involved as the condition spreads; (3) goundou may be asymmetrical; and (4) may occur in Europeans exposed at an early age to West Coast influences.

Ainhum.—The constriction which arises at the junction of the covered and free portion of the fifth and (occasionally and subsequently) the fourth toes of

either foot occurs not only amongst negroes, but is common amongst the Chinese in South China, and I have seen a case in India. The patient I saw in India was, I believe, a Maharatta. That the disease was of a leprous nature I at one time believed, but a careful investigation of this particular point for some seven or eight years showed the belief to be erroneous.

Report.

A RESEARCH INTO THE ETIOLOGY OF BERI-BERI—“Together with a Report on an Outbreak in the Po Leung Kuk.” By William Hunter, Government Bacteriologist, and Wilfrid V. M. Koch, Medical Officer in charge Infectious Diseases Hospitals, Hong Kong. (Noronha & Co., 1906.)

IN this report, dated Hong Kong, December 29th, 1905, and which has just come to hand, Drs. Hunter and Koch, in their introductory letter, state :—

Primary gastro-duodenitis not present.—The most interesting feature of this part of the report is the question as to the presence of a primary lesion in beri-beri. Medical papers at the present time are full of beri-beri, and one of the most widely discussed questions in this connection is whether there exists in beri-beri a *primary gastro-duodenitis, the premonitory syndrome of Hamilton Wright*. According to our results such a lesion does not exist. Gastric and duodenal changes, and indeed occasionally changes of variable pathological degree of the entire small gut are often found in beri-beri cadavers. These, however, do not appear to be primary and the seat of primary election of the so-called virus of beri-beri. Congestions, hæmorrhages, cedematous infiltrations and even patches of necrosis have often been found in the gastro-duodenal mucosa, but that these are due to the actual beri-beri virus we have reason to doubt. Microscopically the changes found are difficult to class with active inflammation as found in diphtheria. They resemble more closely the changes consequent upon passive hyperæmia and congestion set up by precedent nerve degeneration. Arguing, *a posteriori*, little weight is to be given to the changes found in the alimentary canal, and our observations in this respect are more or less in accord with the recent investigations of Durham, who lately studied beri-beri in Christmas Island and the Federated Malay States.

No neuro-organism found.—The bacteriological investigations which have been made during the research were many, and of a varied character. Almost every tissue and fluid of the bodies of cases of beri-beri have been submitted to a searching examination by almost all the methods available for the isolation of specific micro-organisms. On referring to this part of the report in detail, it will be seen that we found it impossible to find any micro-organism which could be brought into causal relationship with the disease. Again and again cocci, bacteria, &c., could be obtained from beri-beri patients of fresh cadavers. These were of the same nature as the micro-organisms

isolated by other workers. Detailed bacteriological work and experiments proved, however, that such micro-organisms have nothing to do with the production of the disease, and in the light of our present micro-biological knowledge must be regarded as extraneous organisms isolated and fully described by investigators using somewhat defective technique. The bacteriological examination of Wright's so-called primary lesion, *i.e.*, damaged gastro-duodenal mucosa resulted in the isolation of many rod-shaped bacteria, the biology of which showed them to be nothing more or less than ordinary intestinal micro-organisms. In summing up our bacteriological results, our investigations strongly point to the conclusion that *beri-beri* is not due to any micro-organism of the hitherto described types. Indeed we doubt if the disease is an acute specific infectious disorder. So far our results are against its being so.

Animals not liable to the disease.—Coming to the experimental part of the report, the results of our attempts to induce the disease in any of the common domestic animals are decidedly a failure. In no single instance, out of over fifty miscellaneous experiments upon monkeys, pigs, calves, sheep, fowls, rabbits, &c., were we able to call forth even the shadow of a symptom or sign of *beri-beri*.

Comparing the results of these experiments with the series carried out by Durham, who also had negative results, it would appear that it is impossible to convey *beri-beri* directly from man to animals. So far as published records are concerned, monkeys are the only animals which appear to have contracted the disease, and then only under natural conditions. These—the experiments of Hamilton Wright and published in a recent number of "*Brain*"—however, are isolated observations, and judging from the recent remarks of Durham in the *Journal of Hygiene* some doubt would appear to exist as to the real condition of the monkeys described by Wright as suffering from *beri-beri*.

The question as to whether any animal can contract *beri-beri* direct from man, or indirectly through some other channel, must remain open. Our own opinion is decidedly against the conveyance from man to animals. With the exception of Hamilton Wright's experiments, which must be received with due caution, there are no reliable records of *beri-beri* in animals. Indeed it would be difficult to experiment along these lines with hope of success in the absence of the etiological factor and its point of invasion of the body.

Our experimental researches bring us further along the line of our conclusions as to the non-micro-organismal nature of *beri-beri*. Up to the present time none of our researches have guided us to form a conclusion that it is a specific infectious disease. Indeed all the evidence contained in this report is against such a conclusion.

The premises upon which we built up such a statement so antagonistic to the theories of Hamilton Wright are the following:—

(a) There is no evidence of a primary lesion, *i.e.*, a point of invasion of the virus into the body. This, however, carries with it very little weight, as many specific infectious diseases have a somewhat cryptogenic point of entry into the human tissues.

(b) No specific micro-organisms can be found in any organ or tissue of any case of *beri-beri* which can be brought into close causal relationship with the disease. The micro-organisms found in Wright's so-called primary gastro-duodenitis are to be regarded as ordinary bacteria belonging to the intestinal flora.

(c) Experimental researches are negative. The blood contains no organisms, and the transference of large quantities of *beri-beri* blood to the tissues of healthy animals never induces disease.

Similar results are obtainable with the spleen, liver, brain, &c.

When we come to the gastro duodenal mucosa as found in acute and rapidly fatal cases of *beri-beri*, and use an emulsion of this for feeding monkeys—animals said by Wright to contract *beri-beri* naturally—and obtain uniformly negative results, our faith becomes somewhat shaken in the micro-organismal nature or the specific infectivity of *beri-beri*.

In conclusion, the results of our researches are directly opposed to those of Hamilton Wright, and in more or less harmony with those of Durham.

Of late years a considerable diversity of opinion would appear to prevail as to the isolation of *beriberics* and the treatment of *beri-beri* cadavers. From our researches we can see no valid reason to suppose that in *beri-beri* we are dealing with a highly infectious disease. Indeed beyond the removal of such patients to surroundings light and airy, with the regulation of a liberal and wholesome diet, nothing more would be required to add to the sum total of the necessary sanitation.

As regards the burial of *beriberics*, this, in our opinion, is of no vast importance apart from the question of the decomposition of the body. If provision during burial is made for rapid decomposition, as now laid down by all hygienists, no danger will accrue.

Having summed up the results of our investigations into this interesting disease it but remains to speculate on a theory as to its etiology. In these days everyone strives to have a theory in regard to the etiology of a disease like *beri-beri*. Whether such a course is advisable, in the absence of any definite data, we leave open for speculation.

Reviews.

MEDITERRANEAN FEVER IN INDIA: "Scientific Memoirs." By Officers of the Medical and Sanitary Departments of the Government of India. "Mediterranean Fever in India: Isolation of the *Micrococcus Melitensis*," By Captain George Lamb, M.D., I.M.S., and Assistant-Surgeon M. Kesava Pai, M.B., C.M. (Madras). New Series. No. 22. Price 10 annas, or 1s.

Captain Lamb and Assistant-Surgeon Pai have succeeded in establishing the fact that Mediterranean fever is met with amongst residents or natives of India. In eleven of the cases the *M. melitensis* was isolated from the spleen during life. Nine of the patients were Sepoys of the 27th Punjabis, Multan; one was a Sepoy of the 12th Sikhs, Ferozepore; and

one was a man, also from Ferozepore, ten years resident in India.

In six of the cases no splenic puncture was made, the diagnosis resting solely on the clinical history and the serum agglutination reaction. Two of the cases were Sepoys in the 27th Punjabis, Multan; one was a prisoner in the Ferozepore jail; two, a man and a woman, resident in Lahore; one a native of Murree. There was found to be a great difference in the agglutination value of the sera in the different cases. The *M. melitensis* was isolated from the spleen at various stages of the disease, in most instances whilst the temperature was still high and the illness more or less acute.

Although many of the cases occurred in the same regiment, careful investigation failed to bring forth any evidence in support of common infection. The men belonged to different companies, to different races, slept in different barracks, and practically never met. The 27th Punjabis, in which regiment the majority of cases of Mediterranean fever occurred, were stationed at Multan since January 29th, 1905; previously the regiment were quartered at Ferozepore, also in the Punjab, and many cases of a kind resembling Mediterranean fever had occurred in the regiment before leaving Ferozepore for Multan. The 15th Sikhs succeeded the 27th Punjabis at Ferozepore, and one man of the former regiment developed Mediterranean fever at Ferozepore. This, however, seems to have been the only case, so that the infection left behind by the 27th Punjabis cannot have been severe. The explanation of the 15th Sikhs escaping the disease so markedly is believed to be due to the fact that over two months elapsed between the arrival of one regiment and the departure of the other.

A VOCABULARY OF MALAY MEDICAL TERMS. By P. N. Gerrard, B.A., B.Ch., M.D. (Dublin). D.T.M.H. Cambridge. Singapore: Kelly and Walsh, 1905. Pp. 107.

This useful book is well adapted for the purpose for which it was written. In addition to the vocabulary one finds valuable information in the preface. In the appendix will be found sentences for conversational purposes applicable to obtaining the clinical histories of such ailments as beri-beri, venereal diseases, fevers, cases of consumption and of dysentery. Snellen's Vision Test types, adapted to Malay requirements, form a useful practical addition to the vocabulary.

Correspondence.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—In Lieut.-Colonel Giles' article on "Biting Flies," in your issue of April 2nd, he quotes the old French saying "les mouches d'automne pignoient" as probably referring to members of the genus *Stomoxys*, and not to the common house-fly. Under certain weather conditions, however, I have on several occasions—both in South Australia and in Scotland—experienced a slight but irritating "bite" from the latter. The climatic conditions under which this happens are dull autumn days, when summer is just passing into winter and the housewife is in doubt about laying fires.

The species is unquestionably the common house-fly, but how it produces the faint sting I cannot say. Surely it is this occasional occurrence to which the French refer.

Yours, &c.,
Perth, W. Australia.
June 9th, 1906.
J. BURTON CLELAND.

With reference to the above it may be remarked that although the ordinary method of taking food, in the house-fly and its allies, is by means of a sort of licking action performed by the lobes of its so called "tongue"; these insects are nevertheless provided with a short pointed labrum and a hypopharynx hidden above the roots of the former. Though hardly suited for actual piercing, these would be quite capable of giving the slight prick occasionally inflicted by the common fly, which, however, probably only does so accidentally in its effort to obtain as much as possible of the perspiration of the person on which it has settled. Admitting this, however, I believe that *Stomoxys* is far more commonly the real culprit.

Personal Notes.

INDIAN MEDICAL SERVICE.

India Office: Arrivals of Indian Medical Officers in London.—Captain R. E. Lloyd, Captain R. M. Dalziel, Captain R. M. Carter, Major J. B. Smith.

Extensions of Leave.—Lieutenant-Colonel W. S. Eyres, 6 m. Med. Cert.; Captain R. M. Dalziel, 3 m., Med. Cert.

Permitted to Return to Duty.—Captain E. C. Maddoch, Major J. K. Close, Lieutenant R. F. Steel.

Postings.

Captain A. G. Sargent and Captain W. H. Cagaly, services lent to Government of Bombay.

Major Grayfoot, to be Med. Officer, Sind Rifles.

Colonel Benson officiates as Surgeon-General, Madras, with temporary rank.

Major Anderson, Civil Surgeon, Tippera.

Assistant-Surgeon Daley acts as Civil Surgeon, Balasore.

Lieutenant-Colonel G. H. Bull officiates as P.M.O., Bombay.

Major E. R. Parry acts in additional charge as Civil Surgeon, Dacca.

Captain Mathew, services lent to Government of Burmah.

Major A. R. S. Anderson, services placed at disposal of Government, East Bengal and Assam.

Lieutenant-Colonel Denny's officiates as Agency Surgeon and Admin. M. O., N.W. Frontier Province.

Captain Flening, I.M.S., Civil Surgeon, Peshawar.

Major Bidie, Captain Feslir, and Captain O'Neill, services placed at disposal of Government of Madras.

Colonel D. French Mullen, services temporarily placed at disposal of Commander-in-Chief.

Leave.

Major P. P. Kilkelly, Privilege and Study, 1 y.

Lieutenant-Colonel R. N. Campbell, privilege leave, 2 m. 28 d.

Mr. Gibson, Assistant Director, Plague Research Laboratory, Bombay; leave, 2 y.

Captain N. Collinson, leave on Med. Cert., in anticipation of formal sanction.

Dr. P. A. Rigby, Civil Surgeon, Balasore, combined leave, 6 m.

Notes and News.

PUNJAB MEDICAL COLLEGE AFFAIR.—Over a hundred students of the medical school at Lahore, who were out "on strike," have come in and made submission. About 164 others, including the ringleaders, still stand out.—*Pioneer Mail*, June 15th.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Bulletin de L'Institut Pasteur," June 15, 1906.

"The Serotherapeutics of Plague" (La Sérothérapie de la Peste), by Dr. Edward Dujardin-Beaumetz.

As soon as ever Yersin discovered the pathogenic agent of bubonic plague in the epidemic which was raging in Hong-kong in 1894, he sent specimens of this microbe to the Pasteur Institute, where Roux and his colleagues, Calmette and Borel, made vaccination experiments. By using cultures killed by heating to a temperature of 60° C., they succeeded in vaccinating animals, and proved that their serum possessed preventive and curative properties in experimental plague infection, since when horses have been immunised to supply the necessary serum for the treatment of human plague. The process consists in intravenous injections into the jugular veins of the horses, first of emulsions of microbes killed by heat, and afterwards of living microbes which have been rendered hypervirulent by passage through guinea-pigs and rats. The process is a somewhat lengthy one, as it takes from five to six months, for the vaccinations have to be repeated weekly and in progressive doses before an anti-toxic and antimicrobial serum can be obtained which—after due experiments on animals—can be used for human serotherapy.

The test used at the Pasteur Institute for the dosing of the anti-plague serum consists in inoculating a mouse with plague, and sixteen hours later injecting it with $\frac{1}{10}$ th of a cubic centimetre of serum. The recovery of the mouse testifies to the sufficiency of the activity of the serum. In man, the efficacy of an anti-plague serum as a preventive measure has been fully proved, but the effect is only a transient one, and passes away after a period of about ten days, so that a fresh injection of the serum is then again necessary to keep up immunity. If the focus of the epidemic is a restricted one, these injections are of great service; but serotherapy as a preventive measure is out of the question in a country where plague is endemic. In this latter case recourse must be had to the injections of microbial emulsion killed by heat, after the method recommended by Haffkine. In this case immunity is acquired more slowly, but, on the other hand, it lasts longer, and may even persist for several months.

A lengthy list of the world-wide series of vaccinations undertaken up to date is now given, with their several results, and with their varying success. The difference is accounted for as follows:—The anti-plague serum was given too late; in insufficient doses; only rarely by the intravenous method; and lastly, the serotherapeutic treatment was suddenly stopped as soon as the high temperature fell.

As far back as 1898, Simond noticed that among the Hindoos treated, those who received the serum on the first day of the disease had a mortality of 20 per cent., only, those treated on the third day 36 per cent., on the fourth day 66 per cent., and lastly, on the fifth day, 100 per cent. of deaths.

If, therefore, early intervention in the treatment of plague has a favourable influence on the prognosis of the disease, the quantity and the method of the administration of the serum are also no less important. The doses of serum in plague must necessarily be much higher than those used in general practice, as, for instance, in diphtheria, where there is a well-defined lesion only to deal with; in plague, on the contrary, the glandular affection may be general from the beginning, and the plague germs may be present in the circulation of the blood.

In order to successfully counteract such a severe onset, it is necessary to inject large and repeated doses of the serum. Duprat, at Rio-Grande do Sul, administered *subcutaneously* doses of 200 to 300 cc., and even more, as a first injection, and, according to the severity of the disease, injections of 100 to 150 cc. were repeated every twelve hours. This method gave only a mortality of 15 per cent. Apart from other objections, this method, however, requires one to have enormous quantities of serum at one's disposal, which is not always feasible during an epidemic.

Now the *intravenous* method allows of the organism becoming saturated immediately with antitoxin and in lesser doses. Calmette and Salimbeni, at the time of the epidemic in Oporto, showed the efficacy of this method by obtaining unhoped for cures in severe cases, and especially in pneumonic plague. The quantity injected at any one time, then, never exceeded 40 to 60 cc. of serum.

Since then Penna, of Buenos Ayres, has systematically used the intravenous method for treating his cases in the isolation hospital. He first injects not less than 100 cc., followed by a similar injection twenty-four hours later, and, if there is then no perceptible improvement, by a third injection. His death-rate does not exceed 14.2 per cent.

The serum has also been administered through the peritoneal cavity, with a mortality of 18 per cent.; but this method is not strongly recommended even by its authors.

The following is briefly the procedure for intravenous injection: The veins selected are those on the back of the hand or on the front of the wrist, or in dark-skinned races on the anterior surface of the fore-arm. The serum must be thoroughly limpid and slightly warmed; the needle is plunged into the vein, and the syringe (filled with the serum and with every air-bubble carefully removed) is then adapted to it; the injection is then very slowly forced on; a drop of collodion over the small needle wound is the only dressing required. There is generally great reaction after an intravenous injection, but the symptoms afterwards improve suddenly, almost as if by crisis; the intense glandular pains cease, and in twenty-four hours plague germs have disappeared from the peripheral circulation, and an examination of the glandular juice shows the absorption of the coccobacilli by the polynuclear leucocytes. The accidents due to the serum, such as oedema, erythema, or arthralgia, are only such as sometimes happen with ordinary therapeutic sera, and bear no relation to the doses of the injections or to the methods of introducing the same, and are merely due to the toxic properties normally found in horse blood-serum.

Lastly, the use of *large doses* of anti-plague serum and their administration by *intravenous* injection, cannot be too strongly insisted upon, as serotherapy has hitherto proved the only really efficacious treatment of plague, which still claims too many victims.—(J. E. N.)

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

STUDIES IN PLAGUE.

By Professor Dr. CAMILLO TERNI.

*Biological Laboratory, Museum of Natural History,
Milan (Italy).*

THOUGH the researches of Kitasato [1], Yersin [2], and of the different scientific commissions in India have solved the problem of the etiology and pathology of plague, we have advanced very little in our knowledge of the treatment of the disease. We have regarded plague exclusively as a septicæmic infection of so rapid a course as to confound the local with the general manifestations. All the specific treatment has therefore been exclusively based on serum therapy, regarding it of value even though all evidence points to the absence of success by this mode of treatment.

The laudable desire to obtain for plague the success which till now serum therapy has given only for diphtheria must not delude us into the belief that there are no other means of treatment.

Therefore, after these years of trial during which anti-plague serum has had a large and well-nigh exclusive application in the treatment of plague, it seems to me useful to state some observations made by myself in numerous clinical cases treated by different methods.

PART I.

THE EFFICACY OF PLAGUE SERA.

In a preceding study [3] I had occasion to point out that the plague bacillus in man does not wholly behave as a septicæmic bacterium comparable to anthrax, and that the penetration of, and the diffusion in, the organism does not happen directly by way of the blood. All the clinical and experimental facts show that plague in the beginning is limited to the lymph system, and especially to the glands, where the plague bacillus finds the most favourable conditions of life and development, producing in the so-called bubo a process of inflammation and necrosis, and the formation of extremely toxic substances which, absorbed, give rise to the gravest and most characteristic symptoms of this infection. The presence of the bacilli in the blood always happens at a very late period, and is a secondary factor in the course of the disease; whilst death usually occurs even before the bacilli from the lymphatics appear in the blood in consequence of the grave intoxication of the products elaborated in the bubo acting with a paralysing effect on the capillary circulation. In many cases also after the blood is infected, we may still obtain spontaneous recovery when the general intoxication is less grave [4]. In plague, therefore, the greatest danger to the patient's life depends on the quantity of toxins elaborated by the bacilli in the predilected focus of the lymphatic system, or in tissues of selection, as, for instance, happens in cases of primary plague pneumonia, in which sudden death by capillary vaso-motor and cardiac paralysis is the ordinary issue, whilst the local lesions are of little consequence in determining a fatal issue (Lutz [5], W. C. Hossack [6], L. F. Childe [7]).

In these conditions it is natural that to obtain a specific treatment of plague, the first requisite of the serum must be a remarkable anti-toxic power, especially in the grave cases, when the inflammation at the point where the bacilli are concentrated has reached the necrotic phase, so that phagocytic action is almost in abeyance owing to the impenetrability of the dead tissues, and toxins are thus allowed to run riot, with grave danger to the patient's life.

The essential conditions of the pathologic process of plague, which I was the first to state, have been amply confirmed by the English Commission in India [8], who opportunely observe that in plague there takes place a combined process of invasion and intoxication, and that therefore it is evident that two different qualities of the therapeutic substances must possibly be applied in the treatment of plague. In the first place, anti-bacterial substances capable of killing or checking the growth of the bacteria; in the second place, anti-toxic substances must be applied in order to eliminate or alleviate the symptoms produced by the bacterial poisons, by which is especially compromised the natural resistance of the organism against infection.

Do the curative anti-plague sera actually in use correspond to the fundamental therapeutic conditions above stated? Certainly not. Yersin's first experiments were too hasty, as proved by their want of success during an extended trial, and they wanted the precision attending the process of animal immunisation according to Calmette's and Borrel's and later Roux's [9] proposals (entire and virulent cultures inoculated into horses in gradually progressive quantities).

Yersin's preparation. The principal fact which characterises the plague infection is that the complexity of the symptoms of intoxication appears as soon as the bacillus instals itself in the lymphatic glands and sets up a bubo. Every observer who has studied the serum therapeutics of plague must now be persuaded that no animal, ordinarily at disposal for such preparation, produces an anti-toxic serum in the highest degree suitable for the treatment of plague; and that it is not even possible to obtain a high anti-bacterial power, to give sure and constant results in the initial period of the infection, when the symptoms of intoxication are not yet manifest.

With the method proposed by Lustig [10] it seemed theoretically easier to obtain the vaccine with a greater degree of solubility, and presumably more assimilable, from the chemical treatment it underwent in the preparation; but we are again confronted with another error, because it is demonstrated that the horses destroy only to a small extent the plague nucleoproteid, and that they do not produce in their serum efficient curative substances. From this point of view it is therefore still better to follow the method of inoculating entire and virulent cultures, by which we obtain a greater stimulating action on the phagocytes and the production of anti-bacterial substances which, though feeble, are yet active enough in the fresh serum, especially if we use for the preparation mules, asses and oxen instead of horses. By using horses we are apt to find that the serum has a toxic action instead of a curative one, on account of the undestroyed bacterial poisons which continue to be still active in the serum.

This perhaps explains the fact that in India the mortality was greatest among those treated with serum, although the "cure" began on the first day of the illness, when the conditions are most favourable for obtaining good results.

The English Commission after years of observations and experiments came to the following conclusions on the question of the anti-plague sera :—

(1) "Though the method of serum therapy as applied to the plague has not yet been crowned with a therapeutic success in any way comparable to that obtained in the treatment of diphtheria, none the less the method of serum therapy is in plague, as in other infectious diseases, the only method which holds forth a prospect of ultimate success.

(2) "The serum treatment has not as yet been sufficiently successful to make it desirable to extend the treatment, under present conditions, as a general measure over all the districts affected with plague. Rather, it appears to us that the imperfections of the present methods of preparation and application should be fully recognised, and that it should be realised that the line of progress lies, not in the direction of applying the sera at present available to the largest number of patients, but in the direction of studying in the case of the animals who furnish the serum the blood changes which are associated with the incorporation of the plague toxins, and with the elaboration of antidotal and bactericidal substance. In like manner, we think that the condition of the blood in the human plague patient and the changes brought about by the administration of the serum should be carefully studied."

These principles we kept constantly before us when working in the laboratory of Messina at the serum therapeutics of plague.

How to prepare by various methods an anti-plague serum of high anti-toxic power was our constant endeavour, and I have already published the researches and the results, which are without doubt superior to those obtained from the sera prepared by Yersin and by Lustig-Galeotti, both in the treatment of man and in the experiments on animals. The difference of method in the preparation of serum produced by Yersin and by Lustig-Galeotti is not calculated to determine much difference in the quality of the products and in the curative effects; because the former inoculated into the horses either filtrates of cultures or entire cultures; the latter utilised the protein extracted chemically from the dead bodies of plague bacteria. Neither with the one nor with the other method is it possible to obtain a serum with marked anti-toxic action, especially if horses are used for the preparation, and the result of the treatment is merely a stimulus of the phagocytic action, which is not always decidedly manifest even when intravenous inoculation is employed. A slight advantage may be noted in favour of Lustig's serum, as we may infer from the statistics of the Arthur Road Hospital in Bombay, which, however, are not free from faults of method and calculation.

Similar results in treatment of plague we may obtain with the artificial sera of Hayem and of Fodor, and still better by the inoculation of corrosive sublimate proposed by Bacelli on account of the great

stimulating power exercised by the sublimate on the leucocytes.

After testing by numerous experiments the toxic action of the pathogenic plague products in man and in animals in contrast with those of the artificial cultures, I proceeded to immunise the animals with the products derived from the infected organism (peritoneal exudate of plague-infected guinea-pigs, juice of buboes, &c.) instead of artificial cultures. As the horses exhibited but little resistance against the action of similar products, we substituted mules and oxen for horses, with very promising results; the anti-bacterial and anti-toxic value of the serum obtained by this method, compared with that of the serum from horses immunised with cultures or with Lustig's nucleo-proteid, stands in the proportion of 50 to 1.

The serum prepared according to this method has been amply applied in Brazil side by side with the sera of Lustig and Yersin. The results, however, though favourable to the new method, showing a total mortality of patients treated with this serum of 25 per cent. only, always leave some doubts on account of the relatively limited experience, and from the fact that epidemics often vary in intensity and virulence. Moreover, my serum was recently prepared, whilst the other two sera used were much older. The great instability of the anti-bacterial and anti-toxic substances of anti-plague serum, no matter how prepared, makes it very difficult to have accurate comparable statistics, when either the sera employed are not the same age, or when the epidemics vary in virulence.

Judging from experiments upon animals, plague often takes on a rapidly septicæmic character, showing that the anti-bacterial substances of the anti-plague serum are rapidly eliminated, so that the results vary sometimes with the same sample of serum if it is first used fresh and then after only four or five days. The same has been stated by the English Commission regarding Lustig's and Yersin's sera [11].

To this circumstance must I ascribe the unsuccessful results obtained in Bombay with my serum, which has been tried in a series of 300 patients under the direct control of Mr. Haffkine, to whom I am deeply indebted for so generously allowing so extensive a trial of my preparation. The serum could be applied only after a delay of nearly six months, and it was impossible to substitute it in time with a fresh one.

The instability of the therapeutic substances of anti-plague serum just related is, however, confirmation of the slight (if any) specific action which it possesses.

By none of the known methods have the serum therapeutics of plague been settled, and in the gravest cases the deficiency of the curative power of the serum on account of the feeble and inconstant anti-toxic action is manifest. With the animals ordinarily at disposal in the laboratories for the preparation of sera on a large scale, it is so far impossible to obtain an anti-plague serum which has a curative anti-toxic efficacy in any way comparable to that of the anti-diphtheritic serum, and to this deficiency we must ascribe the failure of serum therapeutics in plague. Only from man convalescent from grave forms of plague, or from monkeys (*Macacus rhesus*) and from rats (*Mus decumanus*) is it possible to obtain a very active anti-toxic and anti-bacterial serum (reducing to 20 to 30 ccm. of

serum the normal dose of U.I.) sufficient for the treatment of cases with the gravest broncho-pulmonary complications, which till now remain intractable to any kind of anti-plague serum. When great quantities of material are required during an epidemic, it is practically impossible to obtain sera of similar strength, owing to the demand exceeding the supply.

The problem of the specific treatment of plague remains, therefore, still in great part unsolved. The advantages actually obtained with serum therapeutics are very limited, and must be considered as a good promise for the future, rather than as a completed or final result.

PART II.

THE SURGICAL TREATMENT OF BUBONIC PLAGUE.

Whoever has had occasion to examine a plague bubo in the most critical period of the disease (third to fifth day) will be persuaded that it is impossible to hope that by serum therapeutics the necrotic mass of the lymphatic glands can be destroyed, seeing that phagocytosis cannot develop effectually in dead tissue; the plague bacilli, therefore, develop rapidly and eliminate toxins, which, in conjunction with the other soluble poisons of the bacterial bodies in disintegration, tend to infect the patient's blood and tissues.

By studying the natural evolution of the disease, one arrives at a rational method of treatment.

In the cases of spontaneous recovery the fever falls by crisis after twenty-four to forty-eight hours, and the infection stops before the real bubo is formed, limiting itself to the inflammation of one or two glands. In other cases the spontaneous recovery may occur in a more advanced period of the disease when the bubo is completely developed, that is, when the inflammation affects the majority of all the glands of a given region. In these cases the bubo begins to fluctuate after the critical period (third to fifth day), and the spontaneous issue of the pus towards the tenth to the fifteenth day follows when an incision has not been made. We must therefore consider as of benign prognosis all those cases in which the plague bacillus finds itself in the buboes associated with the pyogenic staphylococcus, *not because these act by attenuating its virulency or the toxicity of the products*, as some observers thought, but because the intervention of these bacteria in the phase of suppuration favours more rapidly the resolution of the illness with the evacuation of the focus of infection. When the pus is not eliminated in time, death will surely follow either by general infection or by slow intoxication. The benefit of the rapid evacuation of the infecting and toxic products accumulated in the bubo in consequence of the suppuration determined by the pyogenic staphylococcus is so evident that since the most remote antiquity the treatment of plague consisted in hastening the suppuration and the opening of the buboes. Recently one of the physicians of Alexandria, Egypt, thought it expedient to inoculate the pyogenic staphylococcus into the plague buboes as a means of cure when they do not manifest the tendency to suppuration [12].

The contrary occurs when the plague bacillus is associated with septicæmic bacteria (diplococcus) or with the streptococcus, because early in the disease a zone of cedematous infiltration round the glands,

constituting the bubo, is manifest, involving thereby the surrounding tissues and the skin in the inflammatory process. The diffusion of the plague bacilli becomes thereby easier and more rapid, and a general infection is more certain.

The natural or clinical course, which we see the spontaneous exodus of plague follows, indicates the rational method of the treatment of the disease: namely, *either the possibility of stopping the infective process at the beginning of the infection by serum therapeutics in mild cases, or surgical intervention when the progressive development of the buboes and the gravity of the symptoms of intoxication demonstrate that the specific treatment by serum is not sufficient for recovery.*

It is wholly unscientific to regard plague as quite distinct from other pathological states with which we are familiar. In other forms—lymphangitis and lymphadenitis of a malignant character, no physician would think of applying the serum as an antidote before he intervenes surgically. The only difference is that in plague the local phenomena are less evident at the commencement of the attack and are not pronounced until after general infection has shown itself. In other forms of lymphadenitis the local conditions arrest more readily the attention of the observer, and induce surgical intervention before the symptoms of general intoxication and infection are manifest.

Experience gained in the treatment of plague, especially at the Seaman's Hospital of Rio de Janeiro, allows me to affirm without hesitation that the great mortality observed in the plague hospitals results from the want of or delay of surgical intervention, because the infection remains, for a period of three to five days or more, concentrated in primary buboes and adjacent to lymphatic paths. This danger can be got rid of by eradicating the infected part, when the treatment by serum is evidently inefficacious.

From the results of numerous microscopic and bacteriologic researches made in conjunction with Drs. Gomes and Guimares, in order to determine the method of diffusion of the bacilli from the point of penetration to the bubo, I was persuaded of the benefit of immediate surgical intervention in the treatment of plague by a radical operation—the extirpation of the bubo.

In eighty-two patients who presented phlyctenules or furuncles or other primitive cutaneous lesions, it was not possible to find bacilli in the lymph extracted along the course of the lymphatic vessels between the primary lesion and the initial bubo; nor were bacilli found in the tissues surrounding the capsule of the glands.

From this fact we must infer that the plague bacillus does not find favourable conditions of development in the lymphatic vessels, and that only in the glands is to be found the true focus of infection. The diffusion of the bacilli proceeds gradually from gland to gland, and successively into all the glands of a region before it passes into another group; and the process of infection always moves in the direction of the lymph stream from the more superficial to the deeper parts, and never by the way of the blood, or by inflammation of the intermediate lymphatics, unless there are associated with the plague bacillus other bacteria (diplococcus, streptococcus), in which case

more or less diffused lymphangitis, phlebitis and oedema may be observed.

If, for instance, the primary bubo is femoral, located at the apex of Scarpa's triangle, as usually occurs, the infection extends to all the superficial inguinal glands before it reaches the deep glands situated near the crural canal; subsequently the glands of the pelvic cavity may be involved, but at the beginning of the infection, by microscopic and bacteriologic examination we may verify the infection of the inguino-crural glands, whilst the pelvic ones are still healthy. If, on the other hand, the bubo is axillary and formed by the swelling of the gland situated at the distal part of the axilla, the infection extends to all the glands of the region before it involves the subclavicular group of glands. In the cervical buboes also, if determined by primary plague amygdalitis, the infecting process limits itself for days to one or two glands of the retro-maxillary or superior cervical region without extending to the central and inferior cervical group.

In the histo-pathologic examination of the tissues, it is also easy to demonstrate that the manner of infection of the plague bacillus in the glands, as in other tissues, proceeds always by degrees in small foci, first located in the lymphatic spaces, and later becoming confluent, causing a destruction of the tissue (Albrecht and Ghon) [13], (Bandi and Stagnitta) [14], (Powell White) [15]. These pathologic localisations, characteristic of the primary bubo, distinguish it from the secondary buboes, and correspond to those of the primary foci in other organs (tonsils, lungs); they represent, therefore, the first adaptation of the virus in the new host, and are the seats where the bacilli find the best conditions to acquire the virulence and to display the successive toxic and infecting activity. Therefore we see that these primary lesions in the lymphatic channels can be more easily reproduced experimentally with cultures of attenuated virulence; whilst when the bacilli after several passages through the same animal species have obtained the greatest activity, they do not manifest themselves, because we have then an almost immediate general diffusion. Still, the evidence of their presence is at the beginning more evident in the lymphatic system, before they pass into the blood but without the evidence of localisation in initial foci.

From these observations the necessity of the immediate extirpation of the primary bubo would seem evident, and the possibility of cure, in a disease of so rapidly infecting and toxic a character as plague, will be the more certain the more we practise early elimination of the part which represents the primary localisation of the bacilli in the organism and the point of departure of the general infection. Albrecht and Ghon [16], of the Austrian Commission for the study of plague in India, came to the same conclusion, expressing the opinion that in the treatment of plague we ought not to neglect the extirpation of the primary bubo, notwithstanding the use of the serum.

Jamagiwa [17] has also demonstrated that the prompt extirpation of the infected glands is rational and beneficent. And Bandi [18], in some experiments made according to my advice, has also obtained good results in the same direction in animals.

In none of the more recent clinical works on plague has the empiric practice of the past been taken suffi-

cient note of with regard to the surgical treatment of plague. From ancient times we see the principle affirmed that the recovery from plague depends on the rapid evacuation of the buboes, and in order to avoid hemorrhage they advised the use of caustics or the actual cautery. In all the old writings on the treatment of plague the provocation of suppuration is indicated, and not to wait *too long* if this is retarded, to proceed promptly with early incision, or the use of caustics if the suppuration is not yet manifest on the second or third day.

Our first information concerning the surgical treatment of plague goes back to Hippocrates [19], to Archigenes, referred to by Galen [20], but especially to the Arabian physicians (Eba, Sina, Beitar, Isaac Iudeus, Rhazes), and was made known to Western Europe at the time of the Crusades. In the Orient to-day plague buboes are treated by native doctors by deep incisions and the application of caustics or the red-hot iron.

In the epidemics which desolated France in 1500, the surgical treatment of plague, especially by Ambrois Paré [21] and his school, was stated as the only positive and efficacious method among all the other extravagant remedies then in vogue. The same results were obtained by Settala [22] and Tadino [23] in the famous epidemics of plague in Milan in 1575 and 1630. In the epidemic of Marseilles in 1720, with the better knowledge of practice and the study of anatomy, we see introduced, besides the incision preceding suppuration and the medication with the antiseptics (detersives) of that time—salt water and vinegar, also the extirpation of the buboes by the method recommended by Manget [24].

The persistent opinion of all the ancient observers of plague that the result of the cure depends essentially on two conditions is well enunciated by Settala: *Extract in any way and as quickly as possible the matter in order that it will not spread its poison over all the body.* The necessity and efficacy of the immediate surgical intervention in plague before suppuration occurs acquires greater force by the fact that this method was advised exclusively for plague, whilst for all the other inflammatory tumours (as furuncles, anthrax and buboes of other nature) recourse was had to emollient cataplasms, that is to say, a method of expectancy or a more tardy suppuration.

As a complement of this short account of observations of the past, it is of interest to note that the French physicians, during the war for the conquest of Palestine (1799) [25], established as the general method of treatment in plague *the incision of all those buboes which did not present signs of suppuration, in order to facilitate the crisis.* Before he gave this order, Napoleon's English physician, O'Meara, had an equal number treated by incisions and by the usual method (cataplasm, emollients, or revulsives). The result was that many more recovered by the former than by the latter method of treatment.

If, therefore, so favourable and constant results were obtained in the past when the conditions were much worse and when all the technical and scientific resources of modern surgery were wanting, it seems really strange that we should still doubt the efficacy of surgical intervention in bubonic plague.

The tradition of the surgical treatment of plague continued after the above-mentioned epidemics, as we may gather from Proust [26] and Cabanes [27].

The merit, however, of drawing attention in recent years to the advantages of the surgical treatment of plague is due to J. Cantlie [28].

The extirpation of the buboes, especially when they are still in the initial period, does not present any difficulty, and is also borne by the patients without narcosis, local anæsthesia being sufficient, especially when the bubo is superficial.

The operation in the majority of cases is limited to: (1) Incision of the skin and of the superficial aponeurosis; (2) isolation of the bubo from the surrounding tissues; (3) removal of bubo; (4) examination of the lymphatic glands in the neighbourhood, especially if they are hæmorrhagic or tumefied and painful. Dress the wound in the ordinary way.

The operations made in the plague hospital of Rio de Janeiro during the epidemics of 1900 and 1901 numbered 642, with a mortality of 10 to 15 per cent., varying according to the number of the buboes present, their locality, and the duration of the illness before surgical intervention.

The extirpation of the buboes even in the fatal cases seemed to temporarily afford beneficial effects, so much so as to induce one to entertain the idea of a favourable prognosis. At the autopsy of cases with inguinal-femoral buboes which had been operated upon, the cause of death was found to be due to infiltration of the lymphatic glands of the pelvic cavity, owing no doubt to delay in operation or because the patient objected to operation. On the other hand, we have been able to verify the death of a patient from septic peritonitis after nearly a month's laboured convalescence, caused by evacuation of the ichorous matter of a pelvic gland opening into the peritoneal cavity. This case was one of the most typical to prove the insufficiency of the anti-plague serum, also as regards its anti-bacterial action, for we injected more than 300 ccm., and the bacilli still remained living and virulent in the necrotic focus of the gland.

All the operations have been practised in the gravest cases (pestis major), in ordinarily severe cases (multiple buboes, axillary and groin buboes, double groin and pelvic buboes, cervical, parotid buboes), and the results obtained leave no doubt as to the efficacy of the method.

After duly comparing the results obtained in the plague hospital of Rio de Janeiro from treatment by the surgical method I feel myself justified in recommending it, and in regarding the objection put forward in condemnation of the surgical plan of treating plague buboes as without foundation in fact.

And I am also persuaded that the exclusion of this method of treatment depends upon the want of clinical knowledge of the disease, and upon a strange objection of medical men to surgical intervention in ailments of the lymphatic system generally and not for scientific reasons.¹

In none of the individuals operated upon was any inconvenience subsequently caused by extensive extirpation of the glands. The patients left the hospital in about fifteen days after operation and ready to recommence their occupations at an early date.

By examining the temperature charts of typical plague cases treated by different curative methods, one observes that in bubonic cases operated upon, the fever falls at once *by crisis*, and at the same time all the grave symptoms of intoxication (delirium, tachycardia, dyspnœa) cease, whilst they continue for a long time when the treatment is limited to serum only.

In order to demonstrate yet further the efficacy of surgical intervention as the rational treatment of plague, in several cases of double buboes we extirpated the glands from only one side, applying at the same time the serum treatment. The improvement in the patients was at once evident after the extirpation of only one bubo, but on the following days the temperature rose again over 39° C., and followed the sub-typhoid type, with tachycardia and delirium. When the treatment was completed by the extirpation of the second group of buboes, the symptoms of intoxication ceased in a few hours, and the patient became convalescent.

CONCLUSIONS.

(1) In the plague hospital of Rio de Janeiro, the mortality of the patients treated with anti-plague serum only remained between 25 to 50 per cent., according to the cases and the quality of the sera inoculated. But we must remember that in the statistics in favour of serum therapy are included the mildest cases which ordinarily recover without cure. The estimation of the curative effect of the specific anti-plague sera is very uncertain also on account of extreme variableness of the dose in identical cases. Serum is absolutely of no efficacy in the septicæmic type of plague (infection by the gastro-intestinal way), and in pestis pneumonica, where without doubt it is more necessary to administer a substance capable of rendering innocuous the specific virus in the body of the patient.

(2) The inefficacy of the anti-plague sera which are actually used as a means of cure depends on the deficiency of their anti-bacterial power, and on the almost absolute want of anti-toxic substances, because the animals used for the preparation do not readily assimilate and destroy the poisons of the plague bacillus, and do not accumulate in their blood sufficient quantities of anti-bacterial and anti-toxic substances for the cure of man.

On this account we obtain the best results for the serum therapeutics in plague from immunising mules, asses, or oxen, and inoculating them with the juices of the pathogenic products of the animals infected with plague, instead of artificial cultures.

(3) With the artificial sera of Hayem and Fodor we obtained also favourable results, but the inconvenience of inoculating large quantities of liquid directly into a vein induced us to limit the application of such a curative method to a few cases.

(4) With the intravenous inoculations of corrosive sublimate, proposed by Bacelli [29], the mortality oscillated within almost the same limits as those afforded by the specific sera—that is, between 30 to 40

¹ The surgical treatment proposed by myself has also been applied with success in plague cases in Naples in 1902 and 1903, after the serum (Yersin-Roux) treatment had proved useless.

per cent.—and, as I have already indicated, this curative method must be recommended before any other when we have not at our disposal freshly prepared sera, and when it is not possible to practise surgical treatment at a sufficiently early period in the illness. The corrosive sublimate acts as an efficient stimulus of the phagocytosis (Gaglio) [30], and offers the advantage that it is within every physician's reach even in regions where we cannot always hope to have at our disposal other medicaments difficult to prepare, such as sera. It is known also that mercury fixes itself by preference in the lymphocyte of the lymphatic glands and in the plasma, and in this manner sets up an unfavourable condition for the development of the plague bacilli in the tissues which this infecting germ prefers. For this reason I think the use of mercuric chloride preferable to carbolic acid, recommended by Mr. Seymour [31], especially in cases in which we can already demonstrate the presence of the bacilli in the blood.

(5) In grave cases (pestis major) in which it is not possible to expect a success from the serum therapeutics or from other local cures, there remains as the only rational resource the extirpation of the buboes.

I consider the extirpation of the bubo preferable to all the other local cures.

The simple incision of the bubo, with the evacuation of the pus has good results, but has not so rapid and durable an effect in arresting the course of the infection as when the bubo is completely extirpated.

Compresses of tepid disinfecting solutions (mercuric chloride, carbolic acid) are indicated locally, in order to limit the diffusion of the process when the bubo is removed and the injection of those solutions (mercuric chloride, 1 in 1,000, carbolic acid, 1 to 2 per cent.) around the area occupied by the bubo, especially when from the surrounding oedema and from the adhesive periadenitis we may infer that there is a combined action of the plague bacillus, together with other bacteria (*streptococcus, diplococcus*). It is also useful to have recourse to these means when the radical operation is not possible or too long delayed.

All the other local treatments must be considered more pernicious than useful, because they cannot exercise any action on the bacilli located in the tissue of the lymphatic gland, as we thereby lose precious time.

It is an unpardonable mistake to wait for the suppuration of the bubo before we decide upon surgical intervention, because the patient succumbs either on account of the rapid progress of the infection, or from the effect of the toxic products which cannot be neutralised by the curative action of the serum. We must not take into serious consideration either the constitution of the individual, nor pay too much regard to the resistance of the patient; whilst the bubo remains the probability of cure becomes always more remote, the operation has to be performed under much graver conditions, because the extension of the infiltration destroys the anatomic relations of the region, and complications, such as phlebitis, lymphangitis, ichorous infiltrations along the muscular sheath, with the danger of an effusion into the cavities, are more likely to ensue.

If it is not possible in the patient's house to provide

for the surgical treatment, we can at least give intravenous inoculations of specific serum (20 to 40 ccm.) or of mercuric chloride (1 to 2 centigram of the Bacelli solution), and subsequently bring the patient under better conditions to the hospital.

I may affirm with all confidence that if plague is treated by the above indicated method, the mortality is reduced to the conditions and to the limits of the other infectious and contagious diseases generally considered much less grave in their effects.

The opinion of Scheube [32], who does not think the application of the surgical treatment during an epidemic to be feasible owing to the great number of patients, is scarcely sound, especially when we consider that in time of war surgical operations of much greater severity are rapidly and extensively practised.

Surgeons should be substituted for physicians in our plague hospitals during times of epidemics.

BIBLIOGRAPHY.

- [1] Kitasato. *Lancet*, 1894; Kitasato, Nakavaga, *Twentieth Century*, xv., 23.
- [2] Yersin. *Ann. de l'Inst. Pasteur*, 1894, 1897, 1899; *C. R. de l'Ac. des Sciences*, 1894; *Arch. de Méd. Navale*, 1897.
- [3] *Revista Medica de S. Paulo*, 1900; *JOURNAL OF TROPICAL MEDICINE*, Nos. 14, 15, 1902.
- [4] Albrecht and Ghon. "Ueber die Beulenpest im Bombay," *Wien. Aus. der kais. kohl. Hof. und Staatsdruckerei Theil.*, ii., B, p. 515; Gaffky, Pfeiffer, Sticker, Dieudonné, "Bericht ueber die Thatigkeit der zur Erforschung der Pest, &c., Berlin, Verl. von Julius Springer, 1899, p. 265; "Report of the Indian Plague Commission," vol. v., p. 63.
- [5] A. Lutz. *Revista Medica de S. Paulo*, 1900.
- [6] W. C. Hossack. *British Medical Journal*, 1900, p. 313.
- [7] L. F. Childe. *British Medical Journal*, 1897, p. 1215.
- [8] "Report of the Indian Plague Commission," vol. v., chap. v., p. 269.
- [9] Yersin, Calmette, Borrel. *Ann. de l'Inst. Pasteur*, 1899.
- [10] Lustig. "Sierotapia," &c., Torino. Rosenberg e Sellier, 1899; see also Lustig, Galeotti, *Deutsche Med. Wochenschrift*, 1897; Lustig, Zardo, *c.f. Allg. Pathol.*, viii., 1897; Galeotti, Malenchini, *c.f. Bakl.*, 1897; Galeotti, Polverini, "Osservazioni e Note Epid.," &c., Torino, Rosenberg e Sellier, 1898; Galeotti, Polverini, "Su 175 casi di peste trattati col siero antibubbonico, &c.," Firenze, 1898; Polverini, "Serumtherapie gegen Beulenpest," *Munch. Med. Woch.*, No. 15, 1903.
- [11] "Report of the Indian Plague Commission," vol. v., chap. v., p. 281.
- [12] Dr. Valassopoulos. "La Peste d'Alexandrie," Paris. A. Maloine, Edit., 1901.
- [13] *Loc. cit.*, p. 486.
- [14] J. Bandi und Stagnitta. *Zeitschrift für Hygiene*, 1899.
- [15] P. White. *British Medical Journal*, 1901, p. 829.
- [16] *Loc. cit.*, p. 823.
- [17] Jamagiwa. *Virchow's Arch.*, cxl., suppl., 1897.
- [18] J. Bandi. *Revista di Medicina Navale*, 1901.
- [19] Hippocrates. "Opera omnia et notis Annutii Foesii," Francofurti, 1595; "De morb. vulg.," lib. iii., sec. vii., "Status Pestibus."
- [20] Galenus. "Opera omnia," Venetiis, Valgrissus, 1562; De comp. med., Cap. 2, ad Glauc 2-6, De locis affect., Cap. 5-2, De offic. med., Cap. 30.
- [21] A. Paré. "Opera Lib.," xxi. De Peste. "Parisiis apud Jacobum Du Puys," 1582, p. 645.
- [22] Settala. "Cura locale de' tumori pestilenziali." Milano, per G. Batta Bidelli, 1629; "De Peste et pestiferis affectibus, Mediolani," apud Jo. Bapt. Bidellium, 1622.
- [23] Tadino. "Ragguaglio, &c., della gran peste di Milano dell'anno, 1632," Milano, per Filippo Ghisolfi, 1648.
- See also: Paulus Aegineta, "Opus de Re Medica, &c.," Lib. G, Cap. 34; Coloniae, "Opera et impresa Jo. Loteris," anno, 1533.
- Prosperi Alpini. "De Medicina Aegyptiorum, Libri quatuor," Venetiis, 1591.

- Bassianum Laudum. "De originis et causa pestis Patavinae," Venetiis An., 1555, Id. "Cura della Peste," Ven., 1557.
- Th. Jordanus. "Pestis Phœnomena," &c., Francofurti, Wechelus, 1576.
- Massaria. "De Peste," Ven., 1597.
- Hier. Mercurialis. "De peste præsertim de Veneya et Patavina," Basel, 1577.
- Prosper Borgantius. "De Peste," Ven., 1565.
- Victor de Bongentibus. "Decem Problemata de Peste," Ven., 1556.
- Georgius Agricola. "De Peste in 1630," Mediolanum, 1641.
- [24] Manget. "Traité de la Peste, &c., Genève, 1721," pp. 214, 365, 551.
- [25] O'Meara. "Conquête de la Palestine," 1799. Editée par Napoléon (without date).
- [26] Proust. "La défense de l'Europe contre la peste," Paris, 1900.
- [27] Cabanès. *Bull. gén. de théor.*, November 30th, 1899.
- [28] J. Cantlie. *Lancet*, 1897, pp. 4-85; *idem*, 1897, p. 349, "Plague: How to Recognise, Prevent and Treat Plague," London, 1900.
- [29] *Il Policlinico*, 1899, p. 441.
- [30] G. Gaglio. *Archivio per le scienze mediche*, vol. xxi., p. 341; A. Baldoni, *Boll. della R. Acc. Medica di Roma*, Ann. xxxi., Fasc. 1.
- [31] "Report of the Indian Plague Commission," vol. v., p. 444.
- [32] Scheube. "Die Krankheiten der warmen Länder," Leipzig, 1900.
- [33] P. Manson. "Tropical Diseases," London: Cassell and Company, Ltd.

THE ANATOMY OF THE BITING FLIES OF THE GENERA *STOMOXYS* AND *GLOSSINA*.

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(Continued from p. 219.)

THE parovaria (fig. 9) are two long, somewhat convoluted tubes, the larger distal ends of which are attached to the branches of the oviduct near to the point, where they loose themselves in the stroma of the ovaries. They then pass backwards into the ovipositor, and then turn forwards again to their termination in the common oviduct. They have the same trabecular structure as the paragonia, but the trabeculae and the nuclei of their internodes are much larger, and a comparison of fig. 9, Plate I., with fig. b, Plate II., shows that they also present resemblances in structure to that of the younger ovarioles. They appear to secrete a coagulable fluid similar to that of the paragonia. The remaining accessory structures are the spermathecae or receptacula seminis, of which there are three, each of which (Plate II., fig. b.) consists of a dense chitinous sac supported in a cellular mass like an acorn in its cup.

The chitinous membrane is fenestrated, as will be seen in fig. 2, and the ducts are supported by a spiral fibre somewhat like that of a trachea, but much coarser.

Only one coitus takes place between the sexes, and in these sacs sufficient semen is stored on that occasion to last the life of the female.

The ovipositor is quite of the usual type. Lieut. Tulloch describes it as follows:—

"The ovipositor consists of three cylindrical segments of thin chitin, which usually lie telescoped inside the abdomen. There is also a single external flap of dark chitin, which lies folded upon the ventral surface of the fly. When the ovipositor is extruded, by squeezing the abdomen, the receptacula and uterus are pulled down with it and can be seen through the transparent walls. The upper segment has three longitudinal rods of chitin, two dorsal and one ventral. The next is similar, but the last has the two dorsal plates

only. The external flap, which is probably the ventral rib of the last segment, is roughly quadrilateral, and has no divergent prong-like processes arising from its free hinder border."

Within the ovipositor is a complicated system of circular and longitudinal striated muscles, which perform the actions of protrusion and retraction.

The male organs of *Glossina*, as far as their histology is concerned, present no notable differences from those of *Stomoxys*, but according to Prof. Minchin, the paragonia are more of the usual type, being distinct from each other throughout. Those of the female, on the other hand, depart entirely from the usual fly-type, being modified to meet the peculiar plan of reproduction of these insects which give birth not to a multitude of eggs but to a very limited number of larvæ. Owing to this, the common oviduct or uterus is of great size, and to expel the large full-grown larvæ the ovipositor is provided with muscles, which, although on the same plan as those of *Stomoxys*, are so enormously developed that a section of this part of the body on a casual glance looks much like one of the thorax of an ordinary fly. Prof. Minchin's description runs as follows:—

"The female genital organs differ considerably in appearance, according as they are in the gravid or non-gravid condition. In the course of my dissections I have only found one female in the latter state. In the later periods of gestation the condition of the female is obvious externally, but females which do not appear to be gravid are found on dissection to have a small larva in the uterus.

"The female organs (fig. 35) consist, like those of the male, of paired and unpaired portions. The former comprise the ovaries, the receptacula seminis and their ducts, and the

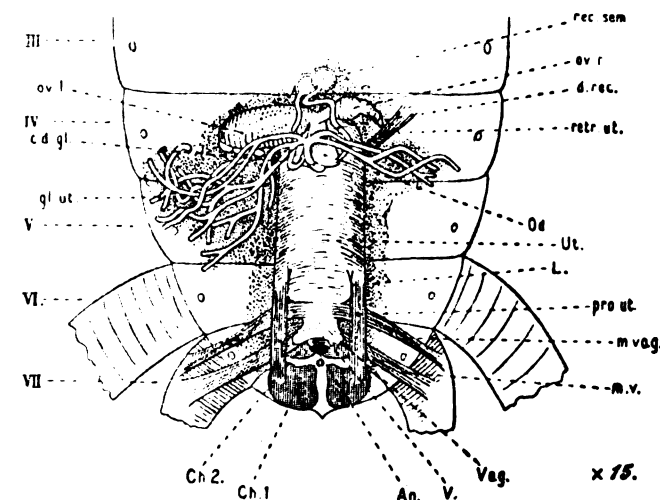


FIG. 35.—The hind segments of the abdomen with the female genital organs of *Glossina in situ*, dorsal view. *rec. sem.*, receptacula seminis; *ov. r.*, *ov. l.*, right and left ovarioles; *d. rec.*, duct of the right receptaculum seminis; *gl. ut.*, uterine glands (the greater number of these have been removed); *c. d. gl.*, their common duct; *retr. ut.*, retractor muscle of the uterus; *Od.*, oviduct; *Ut.*, uterus; *L.*, hinder extremity of the larva, causing a bulge in the uterus; *pro. ut.*, protractor uteri, attached to the chitinous plate (*Ch. 1.*); *m. vag.*, muscle (dilator vaginae?) passing from the vagina to the tergum of the seventh abdominal segment; *m. r.*, muscle passing from the paired chitinous plate (*Ch. 2.*) on each side of the vulva to the seventh tergum; *Vag.*, vagina; *V.*, vulva, the anterior margin of which is shown by a dotted line; *An.*, anus; *Ch. 1.*, *Ch. 2.*, paired chitinous plates. (After Tulloch.)

uterine glands; the latter are the oviduct, uterus, and vagina. The female system of organs is considerably modified from the condition usually found in insects, in relation to the fly's peculiar method of reproduction.

"The ovaries are reduced to a single pair of ovarian tubes or ovarioles, one on each side of the body (figs. 35 and 36, *ov. r., ov. l.*). Each ovariole shows only a small number of egg-chambers, not more than four or five. The lowest chamber is very much larger than any of the others, and contains a large ovum. When this ovum is comparatively small, the other egg-chambers are in a line with it (fig. 6,

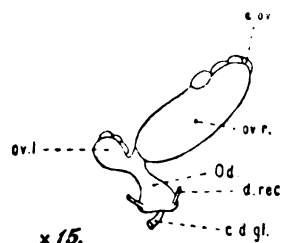


FIG. 36.—The ovarioles and oviduct of a non-gravid female *Glossina*. *a.* *ov.*, apex of right ovariole; other letters as in the preceding figure. The very large ovum in the right ovariole has pushed the oviduct over towards the left side of the body.

ov. r.), but as the ovum grows larger it grows past the other egg-chambers, so that they appear attached to the side of the ovum (fig. 35, *ov. l.*, fig. 36, *ov. l., ov. r.*).

"The two ovarioles are always asymmetrical, owing to the fact that the ova in the lowest egg-chambers reach full growth on each side alternately, so that if there is a large ovum on the left, there will be a smaller one on the right, and *vice versa*. The largest ovum I have seen was from a non-gravid female (fig. 36, *ov. r.*), and was probably nearly, if not quite, full-sized.

"The two ovarioles open into the short, broad oviduct (figs. 35 and 36, *od.*), which widens out at its lower end to open into the uterus slightly behind the proximal end of the latter.

"At its distal-expanded end the oviduct receives right and left the two ducts (*d. rec.*) of the receptacula seminis. The latter (*rec. sem.*) are small spherical bodies of a bright orange-yellow colour, surrounded by a whitish, transparent envelope. Examination of the receptacula stained and mounted in Canada balsam shows that the clear envelope is an epithelium of large cells, surrounding a thick chitinous membrane which gives these organs their peculiar colour, and which is too opaque for the contents to be seen except in sections, by which method the receptacula are seen to be filled with spermatozoa. The two receptacula are firmly attached to one another. From each comes off the slender white duct, slightly convoluted. The ducts are perfectly distinct from one another, and open, as described above, into the lower end of the oviduct.

"Immediately below the opening of the oviduct into the uterus, a small tube debouches into the latter by a median dorsal aperture. This is the common duct of the uterine glands (figs. 35 and 36, *c. d. gl.*). After a short course it branches right and left into tubes, which branch again repeatedly, forming a great number of glandular tubes, which differ markedly in the gravid and non-gravid condition. In the latter state the gland-tubes are relatively few and very slender. In the gravid condition, on the other hand, the tubes are very numerous, forming a tightly packed mass filling up the posterior end of the abdomen, and requiring to be pulled away to show the other parts of the generative system; further, the individual tubes are much thicker, and when stained and mounted, they take up the stain very deeply and appear very opaque. There can be no doubt that these glands serve for the nourishment of the larva in the uterus.

"The uterus (*Ut.*) is a large thimble-shaped organ attached to the body-wall by a number of muscles. Two retractors (*retra. ut.*) run forwards from the proximal end. There are two pairs of protractors, one dorsal, the other ventral; the former (*pro. ut.*) start from the sides of the uterus and pass backwards to a pair of chitinous plates (*Ch. 1*) at the posterior end of the body. The wall of the uterus is beset by a very large number of small tracheal tubes (not shown in the figure), and is thick in the non-gravid condition, but becomes thinner when stretched by the growth of the contained larva. In all gravid uteri that I have seen, the two papillae at the hinder end of the larva cause a bulge in the lower end of the uterus (fig. 35, *L.*). When the larva reaches a certain size, the rings of its segments become plainly visible through the wall of the uterus; they could not be seen in the uterus drawn in fig. 35; but in another, slightly larger, they could be seen distinctly."

The writer is under the impression that there are three and not two receptacula seminis, but the opinion is derived from series of sections and not from dissection.

Only four or five larvæ are produced by each female in a season, so that the insect is much less prolific than even certain mammals, and it can scarcely be doubted that this circumstance offers the best hope of their destruction, as it is obvious that under such conditions the destruction of an adult is a much more serious blow to the chances of multiplication of the race than that of many score of the ordinary oviparous flies. It seems, then, that much might be hoped for from the systematic destruction of the adult flies, and in view of the terrible ravages of sleeping sickness, it cannot be denied that the object is one on which considerable expenditure of money and energy would be more than justifiable.

"Berliner Klinische Wochenschrift," vol. xliii., No. 7.

AFRICAN RELAPSING FEVER.

Koch finds that although quinine is useless in relapsing fever, the trypan-red is of some value. Seeing that immunity is conferred by one attack, Koch is led to hope that some form of serum treatment will be found efficacious. Whilst travelling in an endemic centre of the disease, Koch found that by pitching tents on fresh ground, apart from the old-standing shelters, relapsing fever could be avoided, as the tick only prevails in the dry, long-built shelters on the caravan route.

"Annales de l'Institut Pasteur," Paris, vol. xx., No. 3.

THE FRENCH REPORT ON YELLOW FEVER.

Marchoux, E., and Simond, P. L., in the final instalment of the Report on Yellow Fever by the French Commission to Brazil, go fully into the part played by infant infection in maintaining the endemicity of yellow fever. An outbreak of yellow fever leaves the community almost entirely immune to the disease. Those who escape at the time of the epidemic may subsequently develop the disease in the form of sporadic cases, but were it not for new-born infants the non-immunes would soon be exhausted. Owing to the mildness of the disease in children the affection may escape notice, and because the adults are not attacked the disease is supposed to have died out, whereas in reality it is being continued amongst the infants. This possibility serves to explain how non-immune aliens contract the disease on arrival in the yellow fever zone. The apparent immunity of the negroes to yellow fever is no doubt explainable on the assumption that they had a mild type of the disease in infancy and thereby became protected against subsequent seizure.

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THE Journal of Tropical Medicine

AUGUST 1, 1906.

LIVERPOOL SCHOOL OF TROPICAL MEDICINE—MEMOIR XVIII.

REPORTS OF THE EXPEDITION TO THE CONGO, 1903-5.
By the late J. Everett Dutton, M.B.Vict., and John L. Todd, B.A., M.D., C.M.McGill, with Descriptions of Two New Dermanyssid Acarids by Robert Newstead, A.L.S., F.E.S., &c., and "The Anatomy of the Proboscis of Biting Flies," by J. W. W. Stephens, M.D.Cantab., and Robert Newstead, A.L.S., F.E.S., &c. March, 1906. (London: Published for the Committee of the Liverpool School of Tropical Medicine by Williams and Norgate, 14, Henrietta Street, Covent Garden.) Price 7s. 6d. net.

I.—GLAND PALPATION IN HUMAN TRYPANOSOMIASIS.

Dr. Todd and the late Dr. J. E. Dutton, in their 1904 report of their expedition to the Congo, drew attention to the usefulness of examining the fluid extracted by gland puncture as a routine method of diagnosing the presence of trypanosomes in the human body. The prevalence of enlargement of glands in trypanosomiasis is not only a marked feature, but its universality and constancy are diagnostic signs, and in the report now before us an enquiry into the practicability and reliability of this method of demon-

strating the presence of trypanosomes in the human body has been gone into fully.

Gland Puncture.

The technique of gland puncture is simplicity itself, although requiring care and some experience before satisfactory results are obtained with certainty. An ordinary hypodermic syringe, after the instrument and skin have been rendered aseptic, is plunged into the substance of an enlarged subcutaneous gland held steadily in place between thumb and forefinger.

To prevent scattering the tiny quantity of fluid in the barrel of the syringe by the sudden influx of air when the needle is withdrawn, release the plunger, which had been drawn out to full extent, before the needle is withdrawn from the skin. The drop of fluid in the syringe is expelled from the syringe on to a slide, a cover-glass superimposed, and the preparation, ringed with vaseline, is examined at once. Examination of a first preparation of gland fluid is frequently negative. When glands are particularly soft the fluid obtained is apt to be glairy and pus-like, and therefore rarely contains trypanosomes. The glands usually selected for the examination are those of the post-cervical region.

Comparisons of Clinical Methods of Demonstrating Trypanosomes.

Successful examination may be estimated from several standpoints. When, however, the first test was unsuccessful, further examination succeeded in demonstrating the presence of parasites; the result was as follows:—

	BLOOD			Gland Juice	Cerebro-spinal Fluid
	Fresh Cover-slip Preparations	Centrifugalised	Total		
Percentage of successful examinations	13.3 %	41.2 %	49.2 %	90.4 %	59.6 %
Number of repeated successful examinations	2	1	—	17	No second examination was successful

It will be seen that according to the table the examination of the cerebro-spinal fluid gave moderately constant results only; but when a closer analysis is made it is found that it is in advanced cases of the illness that the examination of the cerebro-spinal fluid gives a high percentage of positive results. By "advanced" cases are meant persons obviously ill; in "early" cases no general symptoms are presented, and the disease is unsuspected by friends.

	BLOOD			Gland Juice	Cerebro-spinal Fluid
	Fresh Cover-slip Preparations	Centrifuged	Total		
ADVANCED CASES					
Percentage of successful examinations	20.6 %	53.8 %	57.3 %	95.6 %	96.6 %
EARLY CASES					
Percentage of successful examinations	8.6 %	25 %	31.4 %	98.5 %	13 %

As trypanosomiasis advances, the glands of all the superficial groups diminish in size, so much so that it is occasionally difficult to find a gland large enough to puncture. As, however, it is during the early stages of the disease that diagnosis by other than clinical features are called for, there can be no doubt that gland puncture is by far the most efficient method of demonstrating the presence of trypanosomes in cases of trypanosomiasis.

Glandular Enlargements an Index of Trypanosoma Infection.

As the result of extensive examinations of many people in many villages, Drs. Todd and Dutton came to the conclusion that in the great majority of cases enlarged cervical glands in apparently healthy negroes means trypanosomiasis in an area where "sleeping sickness" is prevalent.

The region of the body examined for gland enlargement was the posterior cervical group, just in front of the anterior border of the trapezius. In this situation usually three or four middle-sized glands (diameter 1 cm.) lie at the base, or one or two glands of smaller dimensions are met with at the apex of the triangle, where trapezius and sternomastoid muscles meet at their occipital insertions. Occasionally, however, the whole of the posterior triangle of the neck is literally filled with enlarged glands.

Another clinical point of significance is that "unless the glands of apparently healthy persons were enlarged, juices from them did not contain trypanosomes."

The conclusions arrived at by Drs. Todd and Dutton are that (1) as a rule enlarged cervical glands, without obvious cause, do not occur in districts from which trypanosomiasis is absent; (2) every negro with enlarged glands must be considered, until the contrary is shown, to be a case of trypanosomiasis; (3) early cases of trypanosomiasis have enlarged glands, and will therefore be detected by gland palpation; (4) good results may be expected from the serious application of quarantine measures dependent for their efficiency upon cervical gland palpation.

Prevalence of Trypanosomiasis.

By a series of maps the distribution and spread of sleeping sickness in the Congo Free State is clearly

shown, and several interesting facts are dealt with by the same observers under this head. The distributing factor, *Glossina palpalis*, is found everywhere along the route followed by sleeping sickness disease, and it is significant to note that there are several districts in which Glossinæ are found in which there is no sleeping sickness; in other words, the disease may be expected to spread corresponding with Glossina prevalence. It seems from all available evidence that sleeping sickness has spread, and is spreading, more widely as increased facilities of communication multiply; yet it is a mistake to believe that previous to 1885, when the Congo Free State was founded, sleeping sickness was so limited in its distribution as we are apt to imagine. Before the inroad of Europeans in 1884 the highest point in the Congo known to be infected by sleeping sickness was at the town of Bumba, situated on the northern bank of the Congo at the point where the great bend of the river makes its most northerly point, and about 700 miles in a straight line inland from the mouth of the river. In all the districts between Bumba and the mouth the natives knew and had a name for the disease, whereas in the Upper Congo reaches above Bumba the disease is, or was until recently, quite unknown, and the natives either coin a new word to describe it or use a name borrowed from neighbouring tribes. In 1888 the first step towards suppression of the slave trade began, expeditions were sent in all directions, and soldiers and labourers from the infected districts of the Lower Congo travelled upwards along the Kasai River, and penetrated far to the eastward, carrying with them sleeping sickness. In addition to the traffic from west to the east, that is, from the infected districts near the mouth of the river inland, labourers were brought from the upper reaches of the river to work near the mouth, who, when their term of engagement ended, returned to their native places, thereby no doubt spreading infection to many new centres.

The evidence obtainable is, however, not sufficiently unanimous or positive to assert that sleeping sickness did not exist in the area between the Upper Congo and Lake Tanganyika, but that there has been a wider distribution of the disease in many directions since the traffic between Central Africa and the mouth of the Congo has been increased is certain. One point in the investigation seems fully brought out, namely, that when sleeping sickness has once gained a hold on a district, there is no evidence that the disease ever wholly disappears.

"A New Dermanyssid Acarid Found Living in the Lungs of Monkeys (*Cercopithecus schmitzi*) from the Upper Congo." By R. Newstead, A.L.S., and J. L. Todd, M.D.

In the district between Lusambo, in the upper reaches of the Kasai River, and Kasongo, in the Upper Congo, a parasite named *Pneumonyssus duttoni*, n. sp., has been found in eleven monkeys of the *C. schmitzi* species. The parasite has not been met with amongst monkeys of other species living in the same district, so that it would seem that the "funny type" (*C. schmitzi*) of monkey is alone affected. Female acarids only have been found in the lungs of these monkeys, and although no eggs have yet been seen,

larvæ and partially matured acarids were found in the trachea and bronchi of the monkey, from the larynx down to the second and fourth, and even fifth branchings of the bronchi. The species of acarid closely resembles *P. simicola* found in the lungs of a Javanese monkey, but differs in the possession of an additional pair of stigmata, and a large dorsal scutum or shield.

Mr. Newstead also describes another new *Dermanyssid* acarid, which he has named *Pneumonyssus griffithi*, n. sp., obtained from the lungs of the Rhesus monkey (*Macacus rhesus*). The parasite has been named after its discoverer, Dr. C. A. Stanley Griffiths. The new acarid was first found in a series of six adult Indian Rhesus monkeys, belonging to the Royal Commission on Tuberculosis, which were killed for examination, on account of having been in contact with a monkey suffering from spontaneous tuberculosis.

"The Anatomy of the Proboscis of Biting Flies. By J. W. W. Stephens, M.D., and R. Newstead, A.L.S.

The species of fly examined was the tsetse-fly, *Glossina palpalis*, R. D., and the description refers to the female of that species for the most part. In this erudite description many hitherto unsettled points in the anatomy of the labella, labium, labrum, hypopharynx, and the mechanism of the proboscis are dealt with and apparently settled. Many excellent drawings of the proboscis of the *Glossina* accompany the descriptive details.

THE MEETING OF THE BRITISH MEDICAL ASSOCIATION AT TORONTO.

THE visit of the British Medical Association to Toronto promises to be a success, judging from the large number of medical men who are journeying from Britain to attend the meeting. The Association has previously met in Montreal, but Toronto is the furthest distant point from "home" at which British medical men have assembled. Situated on the shores of the Lake Ontario, the focus of several railway lines, and adjacent to important agricultural districts, Toronto has increased of late years to a commercial city of great importance. The public buildings and the wide, handsome streets of Toronto are held in high estimation by the citizens, who are justly proud of their flourishing city. To medical men, however, the University buildings and the history and development of the University are sure to prove more interesting than either the natural beauties of the district or the municipal and commercial buildings of the city itself.

The movement which resulted in the establishment of a Provincial University in Ontario (then Upper Canada) dates from the closing years of the eighteenth century. In 1797 the Governor of the Province, at the request of the Legislative Council and House of Assembly of Upper Canada, petitioned His Majesty George III. to appropriate "a certain portion of the waste lands of the Crown as a fund for the establishment and support of a respectable grammar school in each district of the Province, and also of a college or university." The petition was granted, and the Exe-

cutive Council, in conjunction with the Judges and Law Officers of the Crown in the Province, were instructed to report on the manner and extent of the appropriation. Their report (1798) recommended: (1) The immediate establishment of a grammar school at Kingston, and another at Newark (now Niagara); (2) the establishment of a grammar school at Cornwall, and another at Sandwich as soon as funds should permit; (3) the establishment of a University in York (now Toronto); (4) the appropriation of 500,000 acres of Crown lands for the establishment and maintenance of the four schools and University; and (5) the reservation of at least one-half the whole grant for the purposes of a University. In 1799 the appropriation of lands was made, consisting of 550,274 acres.

From 1799, the project made no progress whatever. In 1819, however, a report was drawn up by the Executive Council, looking towards a realisation of the land endowment, recommending the obtaining of a Royal Charter. In 1820 provision was made by law for the representation of the proposed University by a member in the House of Assembly. In 1825, the exchange of a portion of the original grant of lands for an equal portion of the more valuable "Crown Reserves" was proposed, and was carried into effect in 1828. In 1827 the Charter was granted for the University under the title of the "University of King's College," and the necessary authority was given for the exchange of the original endowment lands above referred to. By this Charter, the teaching, examining and management were entrusted to a corporation, consisting of the Chancellor, President, and Professors.

By the Baldwin Act, the name of the institution was changed from King's College to that of "University of Toronto." Its secular character was made perfectly clear; not only were all religious tests abolished, as regards the Faculty, students and graduates, but it was also provided that neither the Chancellor nor any of the Governor's representatives on the Senate should be "a minister, ecclesiastic or teacher, under, or according to, any form of profession of religious faith or worship." The Faculty of Divinity was abolished, as also the right to confer degrees in Divinity.

In 1887 an Act known as the Federation Act was passed, whereby the various denominational institutions were united with the University of Toronto. Under this Act, Victoria University (Methodist), St. Michael's (Roman Catholic), Knox College (Presbyterian), Trinity and Wycliff Colleges (Anglican), have entered into confederation with the University of Toronto, which latter has also, under the Act, a teaching Faculty of Arts and Medicine. Latin, Greek, Ancient History, English, French, German, Oriental Literature and Ethics are taught both by University College and Victoria University, and the other colleges mentioned, while St. Michael's co-operates in teaching Modern History and Philosophy. By this arrangement, largely one of convenience, all other subjects in Arts and all subjects in medicine are left to the teaching Faculty of the University of Toronto. Both the University of Toronto and University College are supported from a common fund derived from endowments and other sources. Various institutions, such as the School of Practical Science, the Agricultural

College, &c., have entered into affiliation with the University, and enjoy representation in the Senate, which in turn prescribes their curriculum and examines their students.

The architectural beauties of Toronto University are well known. The main building is a handsome structure in the Norman style of architecture, and its classic main entrance is without a rival on the American continents. This building was badly gutted by fire some years ago, but its restoration was thorough and complete, and the building now presents a finer appearance than it did before the conflagration. The University campus is dotted with a series of buildings, each housing a certain branch of the University's work.

Report.

REPORTS ON THE HEALTH AND SANITARY CONDITION OF THE COLONY OF HONG KONG FOR THE YEAR 1905. (Hong Kong: Noronha and Co., 1906.) Pp. 140.

The estimated total population of Hong Kong, including the adjacent territories of Kowloon (old and new) and the military and naval commands, amounts to 377,850. The birth-rate is given as 3.40 per 1,000, and the death-rate as 17.45 per 1,000. The disproportion between the birth- and death-rates which seem unaccountable with a rapidly increasing population is attributable to the fact that the Chinese women in the colony are few in number, and that the wives of the Chinese do not, as a rule, dwell in the colony.

Malaria.—During the past three years the total number of deaths amongst Chinese attributable to malaria has diminished by half, compared with the returns of the previous three years. Amongst Europeans resident in Hong Kong the deaths from malaria during 1905 fell to four, compared with 29, 33, and 32 during the three years 1900-1902.

Dr. J. Bell, the Superintendent of the Civil Hospital, remarks: "There can be no question that the war waged by the authorities against the mosquito has given as good results here as anywhere else." One district in the outskirts of the city of Victoria, which used to supply very bad cases of malaria both in Europeans and their Chinese servants, has not supplied a single admission for 1905. The malignant variety of malaria is much the most common variety and the disease is more prevalent in the latter half of the year.

Dysentery.—The bacillary form of dysentery outnumbered the amoebic variety in a proportion of about two to one. The bacillary form of dysentery would appear to confer an immunity against further attacks, but not against the amoebic type; one patient suffered in January from the bacillary form, but returned to hospital in October of the same year with dysentery of the amoebic type.

The Superintendent of the Civil Hospital states: "I think the amoebic variety is the less prevalent and fortunately so, as it is a much more serious complaint, more difficult and more tedious to treat—in some cases I doubt whether they are ever cured by anything short of removal out of the Tropics." In regard to the spread of dysentery the Superintendent writes: "The

mobile form of the amoebæ die rapidly in the stool, but the encysted form are much hardier, and must be the means of spreading the disease. The question for the future to solve is whether they do not undergo some change in a suctorial insect, and so get passed on to man in a manner similar to malaria."

Plague.—During 1905 the plague cases numbered 304 and the deaths from the disease amounted to 287—a death-rate of 94.1 per cent. These are the smallest figures in regard to plague since 1894, except during the years 1895 and 1897, when the cases of plague numbered 44 and 21 respectively. Of the cases, 73.16 were of the bubonic type, 25.0 per cent. were of the septic type, and 1.84 of the pneumonic variety. Dr. W. M. Koch, the officer in charge of the Infectious Diseases Hospital, remarks: "Of the bubonic variety 85 per cent. died; of septic cases, 60 per cent. It will be noticed that the bubonic variety was the more fatal."

Rat Plague.—"The amount of rat plague," Dr. William Hunter, the Government Bacteriologist, remarks, "would appear to be increasing in the colony. About 5 per cent. of the rats examined during 1905 were found to be plague-infected." He adds: "Arguing from the dictum no rat plague, no human plague, our chances of freeing the colony from this exotic are but small for some years to come." Dr. Hunter is more and more impressed with the part played by the rat in the spread of plague, and experience shows that "Danysz's virus as an agent for the wholesale destruction of rats has been a complete failure." Experience with Yersin's serum in plague during 1905 in Hong Kong is not encouraging.

Relapsing Fever.—Three coolies, on their way to North China from South Africa, were found to be suffering from relapsing fever, and the spirillum was found in their blood. In connection with these cases, an important fact was noted. The office boy of the hospital, to which these cases of relapsing fever were admitted, was attacked by the disease. The boy saw the patients frequently, and helped to coax mosquitoes to feed on them, and assisted in procuring films, but had nothing else to do with the patients in the way of nursing, &c., yet he passed through a typical attack, and the spirochætae were found in his blood. The question of how he contracted the disease is a difficult problem to solve, but the fact that he did so under the circumstance is well worth further investigation. Relapsing fever is prevalent in North China, but is not endemic in Hong Kong.

Malta fever has not been proved to be present in Hong Kong as an endemic infection.

The experiments and observations on beri-beri by Dr. Hunter will be specially dealt with in a future issue.

This report, which will be dealt with in the Colonial Reports, is full of interest, and contains many original investigations and observations.

Reviews.

NUTRITION AND DYSENTERY. By Lieutenant-Colonel U. N. Mukerji, M.D., I.M.S., Retired. (Calcutta: S. K. Lahiri and Co.)

It is pleasant to find that this well-known native member of the Indian Medical Service, although retired

from the service, has no intention of retiring also from active scientific work, and in the present little volume we have the results of a ripe experience in dealing with that most troublesome tropical malady, dysentery.

Dr. Mukerji's view is that dysentery is primarily a trophic malady, the main predisposing causes of which are dietetic errors; in other words, that the dyspepsia of dysentery is the cause and not the consequence of the disease in the stage in which it usually comes first under the notice of the medical practitioner.

Nor is this view in any way incompatible with the results of modern parasitological investigations which have subdivided dysentery into protozoal and bacterial forms, and the latter into a number of varieties in which Shiga's bacillus and a variety of other strains of microbe are found in the motions, for most who have had much to do with the clinical side of dysentery will agree that it is almost impossible from the bedside point of view to predicate what micro organisms will be found by the bacteriologist, and that it is highly probable that it is rather the disease that affords them their opportunity than that they are the *causa causans* of the disease. On this account the reader must not expect to find more than casual mention of the microbiology of dysentery, which has, of course, only an indirect connection with the point of view dealt with by Dr. Mukerji.

There is no better field for the study of dysentery and the effects of diet on nutrition than an Indian jail, as the Indian medical officer acts not only as the physician, but also as governor of these institutions, and is wisely given a very free hand in the management of the dietary of the prisoners.

The service will, we feel sure, be grateful to an old brother officer for many useful hints on the management of prisoners, and the author's intimate knowledge of Indian habits of life, and their bearing on health, will make the book a most interesting one to all who practise in our great dependency. Nearly half the book is occupied with the results of a laborious investigation of the amount of urea excreted in a group of prisoners from March to July—the monthly diet scale being given in a preliminary table, but we fail to find any summing up of the conclusions the author draws from the tabulated results.

Col. Mukerji has a very high opinion of the value of the inunction of oil as a protection against chills, and hence in diminishing the incidence of dysentery, and the reviewer recalls that although in the United Provinces it has been found that a liberal provision of blankets is equally effectual, an issue of oil for this purpose to the "old and infirm" prisoners was attended with most beneficial results.

Here and there peculiarities of diction may be noticed, only natural to an author who writes in other than his mother tongue, but we doubt if any European could be mentioned who would be capable of writing as clearly in Hindustani or Bengali, and the construction will present no difficulties to any one who has lived in India.

Remembering the difficulties that beset the typographer in India, the book has been turned out by the publisher in a creditable fashion, though occasional misprints may be met with.

SCIENTIFIC MEMOIRS. By Officers of the Medical and Sanitary Departments of the Government of India. "On a Parasite found in the White Corpuscles of the Blood of Palm Squirrels." By Captain W. S. Patton, M.B., I.M.S. (Calcutta: Office of the Superintendent of Government Printing, India, 1906.)

Captain Patton's conclusions are as follows: It will be seen that the description of this parasite agrees in every detail with that of a hæmogregarine. The parasite is highly specialised in that it selects the large mononuclear leucocyte for its host. Though closely related to *Leucocytozoon canis* (James), it differs in not having a cytocyst and in possessing a tail. I therefore propose provisionally naming it *Leucocytozoon funambuli*.

As in the case of *Hæmogregarina gerbilli* (Christophers), no developmental forms were found in the organs and the infection remains unaltered for long periods. The squirrels, though harbouring two parasitic worms, were to all appearances as active as the Madras species. It is particularly interesting to note that trypanosomes were never found in the blood of the Kathiawar squirrel, which seems to point to a localised distribution of the blood parasites in very closely related mammals.

Correspondence.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIR,—Mrs. Scharlieb, reported in your issue of April 16th, 1906, writing about the Tropics, says: "Milk is not attainable in some places, in others it is very poor in proteids and fats."

I should be glad of some proof of the latter part of this statement, some published analyses of milks known to be unadulterated, secreted by cows in the Tropics would be useful.

Yours faithfully,

J. TERTIUS CLARKE, L.R.C.P.Lond.,
M.R.C.S.Eng., D.P.H.Camb.
S. D. S.,
Batu Gajah, Perak,
June 26th, 1906.

Drugs and Remedies.

PRICKLY HEAT.—The "Cyclopædia of Medicine and Surgery" recommends as a prophylactic treatment for prickly heat (miliaria) that thin, light woollen garments should be worn next the skin, the body exposed to heat as little as possible, constipation avoided, and the following lotion applied locally:—

R.	Acidi carbolici	...	...	3ss.
	Acidi boracis	...	...	3j.
	Zinci oxidi	...	...	3iss.
	Glycerini	...	...	3ii.
	Alcoholis	...	...	3ii.
	Aquæ q. s. ad.	...	...	3vi.

A dusting powder consisting of:—

R.	Magnesii carb., acidi borici,		
	pulv. amyli, &c.	...	aa 3ii.

When the entire body is involved the patient should

have bran, starch, or alkaline baths. Hyde recommends:—

R. Acidi carbolici	...	...	5iss.
Glycerini	...	...	5ii.
Mentholi	...	...	5j.
Sp. vin. rectific.	...	...	5i.
Aquæ q. s., ad.	...	...	3viii.

to be applied locally.

Acting upon the suggestion of Professor Metchnikoff in his address on "Syphilis and its Prevention," Mr. W. Martindale, 10, New Cavendish Street, Cavendish Square, London, W., has prepared a "prophylactic ointment," suitable for instant use, and in a conveniently portable form.

Books and Papers Received.

THE first number dated July, 1906, of the *Calcutta Medical Journal*, described as the journal of the Calcutta Medical Club, is to hand. The new journal, of which Dr. K. Das is the editor, is to be published monthly at the cost of 8 annas per copy. The journal is intended for the publication of the transactions of the scientific and clinical meetings of the club and other matters of professional interest.

The following articles are among the contents:—

(1) "Ranchi, a Health Resort." By Nareshchandra Mitra, M.A., M.B. The town of Ranchi, sometimes termed "Darjeeling of the Plains," is situated on a tableland more than 2,000 feet above sea-level, and lies 240 miles south-west of Calcutta. The "season" commences in October, and extends throughout the winter. During the winter the climate is pleasant and bracing, and the isolated position of the town serves to prevent the occurrence of epidemic diseases.

(2) "Trypanosomida." By Gopalchandra Chatterjee, M.B. The article embodies a summary of trypanosoma met with in men and animals, nineteen in all, and three species of trypanoplasma in animals.

(3) "Oxalate of Lime in Pregnancy." By I. Mallick, M.A., L.M.S. According to this observer oxalate of lime diminishes during pregnancy.

(4) "A Large Intra-cervical Fibroid." By K. Das, M.D.

(5) "A Case of Cerebral Tumour, with no Symptoms." By C. Chackrabarty, M.B.

(6) "Angioma of the Liver." By M. Mitra, M.D., F.R.C.S. Edin.

In the journal are to be found the Transactions of the Calcutta Medical Club for February and March, 1906; and in addition reviews of current literature. We wish the journal success.

Notes and News.

THE SOUTH-WEST MONSOON.—*The Times of Ceylon* of May 25th, says: The south-west monsoon has done something more than come in like a lamb. It has crept in like a thief in the night, furtively and

unannounced. It was here all the while. The monsoon arrived on May 7th, Mr. Barnard, Superintendent of the Trigonometrical Surveys, informed a representative this morning. The burst, Mr. Barnard explained, was a traditional and popular term, but was not recognised scientifically, so he was unable to say whether the monsoon had burst. "I have known the monsoon arrive where there is a perfectly clear sky," he remarked. "It came exceptionally early this year. Since the 7th of this month we have really been in the true monsoon. This is indicated by the direction of the wind, which settled down to blow in the south-west on that date."

Mr. Barnard, in speaking, had charts before him showing the direction of the wind each day. He added: "Other conditions, such as wind velocity, the temperature of the atmosphere, rainfall, &c., place it beyond doubt that we have been experiencing the south-west monsoon at least since the 7th inst. The wind was variable before that. The big rains started on the 13th inst., but the velocity of the wind was not affected at that date. The monsoons vary as to rainfall. It is too soon to say, yet, whether this is a monsoon of exceptionally light rain. In the next few days, or next week, we may have more than will make up for the deficiency."

Despite this statement, the Ceylon people do not believe that the monsoon has yet appeared. Yesterday evening certainly was monsoonish, but the usual signs of heavy rain and strong south-west wind are still absent, according to popular notions.

REPORTS from India, dated June 22nd, state that the south-west monsoon has set in throughout the whole of India, including the Punjab and Himalayas.

INDIAN MEDICAL SERVICE.—The Secretary of State has sanctioned the appointment of officers of the Indian Medical Service to be Director of the Pasteur Institute at Kasauli and Assistant Directors at the Kasauli and Coonoor Institutes, on the scale of salary sanctioned for officers of the Bacteriological Department. An addition of three officers will be made to the Indian Medical Service in order to provide for these requirements.

PESTIS SIMULANS.—E. S. Goodhue, writing from the Hawaiian Islands, on "Hawaii as a Field for Scientific Work in Tropical Medicine," states that Dr. Sinclair of Honolulu, suggests the term *pestis simulans*, instead of *pestis minor*, for a climatic bubo as defined by Cantlie. *Pestis simulans* is commendable "as being non-committal for cases that run a mild course of true plague in districts where plague is more or less epidemic, and where it is impossible to demonstrate the presence of plague bacilli."

INDIA has a staff of mounted army nurses. The Indian Government allows these ladies of the Indian Nursing Service thirty rupees a month for the upkeep of their horses, and free conveyance of their animals to and from active service. This corps of nurses are all ladies of good social position, and have to undergo three years' training in a general hospital before qualifying.—*Indian Public Health*.

SEA SICKNESS.—A hypodermic injection of $\frac{1}{100}$ grain of sulphate of atropia and $\frac{1}{100}$ grain of sulphate of strychnia is recommended (Girard) as a specific for sea sickness. The injection to be given at the commencement of voyage or when the sea commences to be rough.

X-RAY BURNS.—At the 337th regular meeting of the New York Dermatological Society, held November 28th, 1905, the subject of X-ray burns was taken up, and Dr. Henry G. Piffard, Emeritus Professor of Dermatology in New York University, said (*Journal of Cutaneous Diseases*) "that he had obtained the most benefit in treating these conditions from antiphlogistine, chloride of zinc, high frequency current and ultra-violet rays."

We regret to notice the death of Lieut. Waller H. Hills, R.A.M.C., of cholera, at Cawnpore. The deceased officer was only 28 years of age, but was already extremely popular, alike with his patients and his brother officers.

Personal Notes.

INDIAN MEDICAL SERVICES.

India Office: Arrivals of Indian Medical Officers in London.—Lieutenant-Colonel W. A. Lee, Lieutenant-Colonel M. Collie, Major T. D. C. Barry, Colonel H. Hamilton, C.B.

Extensions of Leave.—Captain H. R. J. Rainier, 4 m., Med. Cert.; Captain T. H. Delaney, 6 m., Med. Cert.

Leave.

Captain W. Collinson, 1 y. general leave.

Captain W. B. Turnbull, priv. leave, 3 m.

Major W. J. Buchanan, Insp. Gen. Jails, Bengal, priv. leave, 2 m. 15 d.

Lieutenant-Colonel D. G. Crawford, priv. leave, 2 m. 27 d.

Postings.

Colonel O. Todd, R.A.M.C., to the Poona Division, and to act as P.M.O. Western Command during the absence of Colonel Trevor, on leave.

Captain H. J. Walton, Civil Surgeon, Manipuri.

Captain Knapp, services placed temporarily at disposal of Government of Burmah for employment in Jail Department.

Captain H. Ainsworth to officiate as Medical Adviser to the Patiala State.

Major C. H. James is deputed to accompany Sir Rangbir Singh, K.C.S.I., of Patiala, to Europe.

Mr. E. W. Payne officiates as Insp. Gen. Jails, Bengal.

Medical Notes.

GLANDULAR FEVER.

A good deal of interest attaches at the present time around this loosely named illness. In a medical man suffering from general enlargement of glands, with a series of skin lesions resembling a syphilide, Drs. Stengel, White and Evans, of Philadelphia, found that syphilis was negatived, *Spirochaeta pallida* was not found, but a streptococcus resembling one met with in horses and causing glandular fever and also epidemic coryza in these animals, was detected in the patient's blood, glands, and tonsils

ISTHMIAN CANAL COMMISSION.

In his report for May, 1906, Colonel W. G. Gorgas states that during the month in question there was but one case of yellow fever in the Zone. Pneumonia continues to be by far the most common cause of death amongst the men employed on the Canal work. Malaria is less prevalent, beri-beri is decreasing, and the general health is excellent in all parts of the Zone of work.

Dr. Novy, at the meeting of the Association of American Physicians, said he had prepared a serum capable of immunising against relapsing fever, and curative if given in early stages. We anxiously await further reports on this announcement.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"The Philippine Journal of Science," May, 1906.

Tyzzer, E. E., "The Histology of the Skin Lesions in Varicella."

Whifford, H. N., "The Vegetation of the Lamao Forest Reserve."

Bacon, R. F., "The Waters of the Crater Lakes of Taal Volcano, with a Note on some Phenomena of Radio-activity."

Lewis, G. N., "Concerning Silver Oxide and Silver Sub-oxide."

The Suppression of Malaria at Ismailia.

"Suppression du Paludisme à Ismailia" (The Suppression of Malaria at Ismailia). Suez Canal Company, 1906.

The object of this pamphlet is to demonstrate the methods by which Ismailia has been completely cleared of malaria.

Ismailia, which was founded by de Lesseps in 1862, on the banks of Lake Timsah, midway between the Mediterranean and the Red Sea, has now a population of 8,000 inhabitants.

Malarial fever suddenly appeared in this town in 1877 (up to which time it was noted for its healthfulness), and spread to such an extent that in 1886 nearly all its inhabitants had suffered from ague. On several occasions the Suez Canal Company endeavoured to arrest the development of malaria at Ismailia, but without any appreciable results. In 1901 a fresh attempt was made by Prince Auguste d'Arenberg, the President of the Company, which was more in accordance with the ideas which had just then been published on the part played by mosquitoes in propagating malaria. This attempt has met with complete success, for after two years' efforts all trace of malaria has disappeared from Ismailia.

The object of these remarks is to give some general idea as to the nature of the work undertaken and of the measures adopted which enabled this result to be obtained.

[The natural and medical histories of malaria are now so well known that they need not be mentioned here.]

The researches initiated by Prince d'Arenberg, in the spring of 1901, were undertaken with a view to the possible methodical destruction of mosquitoes at Ismailia, and pending the results of these studies the prophylactic use of quinine was widely employed amongst the inhabitants, the employees who suffered from malaria were medically treated gratuitously and received full pay whilst on the sick list.

Briefly stated, the studies made during the years 1901 and 1902 were mainly directed to the four following main points:—

- (1) An examination of the adult perfect Anopheles.
- (2) An examination of Anopheles larvæ.
- (3) An examination of ordinary mosquitoes.
- (4) An examination of the ground levels, with a view to the possibility of causing the stagnant waters to disappear.

The results obtained were as follows:—

(1) The dangerous season commenced about July, and one of the first centres of production for Anopheles mosquitoes was situated to the east of the town; at the same time no Anopheles were to be found either in the European or in the Arab quarters, although the whole town was afterwards invaded. The specimens captured were afterwards found to be *Anopheles pharocensis* and *A. chaudoyei*.

(2) It was definitely proved that the reproduction of the Anopheles mosquitoes was carried out exclusively in the pools and smaller shallow ponds which were to be found everywhere, and that these were filled on the rising of the Nile, although they subsequently became dried up.

(3) The ordinary mosquitoes belonged to the genera *Culex* and *Stegomyia*, of which there were numerous species; both of these generic forms went on increasing their numbers nearly all the year round, in the cesspits, ponds, garden water-ways, and cisterns, &c., as well as in those collections of water where Anopheles larvæ were found. Experiments were made as to the destructive action of petroleum spread over the waters which contained larvæ, and also as to the quantities required for each square yard of surface to ensure efficiency of result; the effect of salt-water and of sea-water on larvæ and nymphæ showed that these could at once be killed by the water of Lake Timsah.

(4) In order to destroy the Anopheles it would be necessary to do away with all stagnant collections of water in which the larvæ of these mosquitoes had been found, and a careful survey of the town and its neighbourhood showed that this would not be a very costly undertaking.

To complete these observations, Dr. Pressat (one of the Company's surgeons) was sent specially to Italy to study the latest methods of malarial research work, and Major Ross was specially invited the following autumn to visit Ismailia and to favour the Company with his advice, which was to use every effort to ensure total protection for Ismailia from malaria by the destruction of all the mosquitoes, as this task appeared to be a feasible one. Immediately on the receipt of Major Ross's report, a conference was specially held to propose definite measures and the means of applying them, and it was decided that the destruction of the Anopheles was first of all to be carried into effect, and afterwards that of the other mosquitoes.

Destruction of Anopheles.—The search for Anopheles larvæ revealed three dangerous foci close to the town: (1) To the east, the marsh of Abou-Rahan; (2) to the west, the small ponds, open drains for irrigation, and pumping-stations for the cultivated land near Nefche; (3) to the south, near the northern bank of Lake Timsah and close to the bathing sheds, some collections of water which were formed only during the rise of the Nile.

The measures adopted were briefly as follows:—

The great marsh was intersected with deep channels which were stocked with fish, the reeds were removed, and the soil (wherever this was possible) was levelled, all depressions being filled up with sand; the smaller ponds and swampy spots were all filled in, the irrigation drains were cleared and deepened, and also stocked with fish, such as eels, mullet, and a species locally known as *chaba'r* (*Tilapia galleila*).

Destruction of Ordinary Mosquitoes.—The works undertaken for the destruction of Anopheles also helped to bring about that of *Culex* and *Stegomyia* outside the town, but those inside the dwellings had yet to be dealt with. This task did not offer any great difficulty, as it consisted in the periodical emptying of all receptacles for water, wherever this was possible, or of spreading petroleum on the water if the receptacles could not be emptied.

The town of Ismailia was therefore divided into six districts (one for each week-day), and every house was inspected

once a week, and on the same day of the week, by a squad of three Arabs commanded by an European, who were told off exclusively for this purpose. During this inspection every receptacle for water, including the ornamental garden ponds, had to be emptied and dried in the presence of the chief of the squad, and the inhabitants were cautioned against immediately refilling the emptied receptacles, as this might revive the half dried up larvæ. The cesspits at the same time were treated with a mixture consisting of one part of heavy petroleum to three parts of lamp petroleum, in the proportion of one glassful to every square yard of surface. [Before commencing these petroleum operations, all the vent-holes had been covered over with metallic gauze to prevent the escape of mosquitoes, which would otherwise have been driven away by the smell of the petroleum.] The Company had also previously obtained Government sanction for the sanitary squad to enter into the Arab dwellings; but as the inhabitants were put to no expense, and had no work imposed upon them, they readily submitted to this weekly inspection, and soon volunteered their help in applying the measures adopted.

Cost. Initial Expenses.—The filling in of the ponds and drainage of the marsh land cost about £2,000 altogether.

Permanent Expenses.—The upkeep of the drains (cutting weeds and reeds, &c.) in the neighbourhood of the town costs £312 per annum; the petrolage of the cesspits and blind wells and the filling in of local puddles in the town itself costs £420 annually, or a total yearly expenditure of £732.

Results.—Since the commencement of 1903 the common mosquitoes have disappeared from Ismailia, and all the inhabitants have been able to dispense with their mosquito-nets, which are so troublesome and anti-hygienic in hot climates. Since the autumn of 1903 not a single Anopheles larva has been found in the protected zone, which now extends for nearly a mile all round the town.

Since 1902 malarial fevers have shown a manifest decrease, and since 1903 no fresh case of malaria has been notified in Ismailia.¹

It must, however, be noted that adult Anopheles are still occasionally found in the autumn in Ismailia, probably driven in from a distance by certain winds; but that they constitute no danger is proved by the disappearance of fever from the town.

Of all the hypotheses put forward to account for the invasion of malaria in 1877, the most probable one is that Anopheles have existed from all time in this region, but that the sudden appearance of ague in 1877 was due to the arrival of malarial patients at Ismailia. At this time the Ismailieh Canal was dug, and many Italians were employed on this work, and probably several of them had already suffered from ague in their own native country.—J. E. N.

1900	..	2,050 cases (old and new, combined).
1901	..	1,990 " " "
1902	..	1,550 " " "
1903	..	225 " " "
1904	..	90 " " "
1905	..	55 " (55 old, 0 new).

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

BERI-BERI—A RESTATEMENT AND REPLY TO SOME CRITICISMS.

By HAMILTON WRIGHT, M.D.

BEFORE dealing with some recent work on beri-beri and criticisms of my own views as to the nature, &c., of the disease, it may be well to restate in epitome what the latter are. This will save reference to brochures which may not be readily available.

CLINICAL ASPECTS.

After several years of exhaustive etiological, clinical, and pathological researches on beri-beri, together with a review of the work of those who had preceded me in the study of the disease, the following conclusions were formulated as to its cause, onset, course, classification and termination :—

That beri-beri is, in its origin, an acute infectious disease. That it is independent of food regarded as food, or of any micro-organism whose special habitat is a foodstuff. That on the contrary, it is caused by a specific bacillus which is to be found under those general conditions which govern most specific micro-organisms. That, generally speaking, the disease begins in those enjoying good health by more or less pronounced symptoms suggestive of indigestion. That these symptoms (gastro-duodenal syndrome) consist of oppressive feelings or pain referred to the stomach, dilatation of the latter and of the duodenum, with consequent bulging of the epigastrium, vomiting and perhaps diarrhoea. That this syndrome precedes any other symptom of beri-beri by a few hours or days, and that it marks the multiplication of the specific bacillus and the elaboration of its extra-cellular neurotoxin in the contents of the stomach and duodenum. That the gastro-duodenal syndrome is constantly and soon joined by signs of the acute poisoning of the nervous system as the result of the absorption of the specific virus into the circulation, *i.e.*, there are anaesthesia, flaccid paresis of varying extent, oedema and cardiac irritability. That this gastro-duodenal syndrome may either subside or intensify as the poisoning of the neurones proceeds. That the acute poisoning of the neurones reaches a maximum about the twentieth or thirtieth day and then begins to subside and finally disappear. That during the development and presence of the gastro-duodenal syndrome there is probably a continuous secretion of the specific toxin, and that the syndrome, together with the rapidly spreading acute poisoning of the sensorio-motor and autonomic neurones make up acute beri-beri, or beri-beri proper.

Further, that if such cases of acute beri-beri are not treated by strict rest of the acutely poisoned neurones, the symptoms of nerve poisoning do not clear up on the elimination of the causal organism and its toxin (about the third to fourth week from the onset), but resolve into more narrowly confined symptoms which then more or less rapidly change from the acute toxæmic type to a chronic degenerative type. That is, the acute flaccid palsy (to take the most obvious symptom) insensibly resolves to chronic atrophic

paralysis as the result of an inertia degeneration imparted to the neurones by the specific neuro-toxin, active only in the acute stage of the disease. I pointed out that this chronic stage of the disease is not beri-beri proper, but simply a degenerative paralysis residual to the more extensive toxæmic palsy of acute beri-beri or beri-beri proper. I feel bound to be somewhat tautologic on this question, because what seemed to many to have been a plain statement has nevertheless been misconstrued by recent critics of my views. So much for the clinical aspect of beri-beri.

PATHOLOGICAL ASPECTS.

The pathology of beri-beri was studied with strict regard to the clinical signs and duration of the disease. A considerable number of new facts were elicited, and these, with the data of the older observers, were co-ordinated as logically as possible. In regard to the pathology of beri-beri the main conclusions were as follows :—

That nearly all cases of beri-beri, fatal in the acute stage of the disease (first to sixth week), exhibit a necrosis of the gastro-duodenal and neighbouring mucosa along with the signs of inflammation. That in association with this gastro-duodenitis there was found a rod-shaped bacillus of constant morphological character. That, taken with the onset of the disease by a gastro-duodenal syndrome, it seemed pretty conclusive that the gastro-duodenitis would have to be regarded as the primary lesion of the disease, and that the constant presence of the rod-shaped bacillus was suggestive at least that we were dealing with a specific organism. Further, that the morbid anatomy of the acute stage of the disease was distinctly different from that of what I termed the residual stage. That in the former classes of cases the lesions were of the nature of an acute poisoning of the peripheral terminations of the neurones (no signs of degeneration in them) and that the changes in all other organs were secondary to such an acute poisoning. That is, there is dilatation of the right heart (no hypertrophy whatever), a small amount of fatty degeneration only, and more or less passive congestion of lungs, spleen, liver and kidneys (no necrosis in these organs at all). On the other hand, that in cases of residual paralysis (from three months' to several years' standing) there is not found a gastro-duodenitis except in cases reinfected. That the peripheral terminations of the involved neurones now show various degrees of true inertia degeneration, Wallerian in appearance, and that this degeneration has migrated towards the trophic centres. That there are found some signs of chronic derangement in the body organs, namely, dilatation of the chambers and true hypertrophy of the cardiac muscle, coextensive with the amount of degeneration in the cardiac nervous system, and the time which has elapsed since the degeneration set in; chronic emphysema and even slight fibrosis of the lungs, with signs in the liver, kidneys and spleen of the effects of prolonged passive congestion.

CLASSIFICATION OF BERI-BERI.

Upon both clinical and pathological data there was propounded a new classification of beri-beri which I hoped would be regarded as scientific rather than merely descriptive. The older classifications took note

of some one feature of the disease, such as œdema, or muscular atrophy, and the disease was then written of as wet or dry beri-beri. There follows the new classification:—

Acute pernicious beri-beri, which is rapidly fatal because of the impact of the specific toxin on the terminations of the entire cardiac nervous system. In this class of cases there may, of course, be other signs of the acute disease: varying degrees of œdema, flaccid palsy, vaso-motor disturbance, &c. But the main features are that the onset is sudden, the cardiac neurones bear the brunt of the poison, and the cases are rapidly fatal.

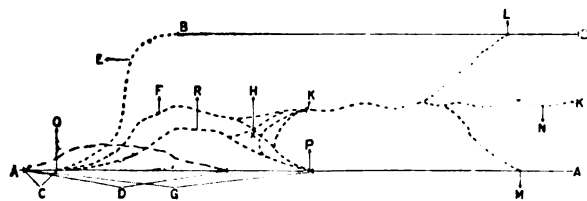
Acute and subacute beri-beri, in which the onset is more or less sudden and well marked, but in which, though there are many signs of neuronal poisoning, the virus is not specially incident on the cardiac nervous system.

Beri-beric residual paralysis, or the chronic stage of the disease due to an inertia degeneration of various kinds of neurones, from the impact of the virus in the acute stage of the disease.

These different class names, it was suggested, may be modified so as to indicate which particular neuronal system is involved, thus:—

Acute	<div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle;">cardiac, motor, sensorio-motor, or vaso-motor</div> <div style="display: inline-block; vertical-align: middle; font-size: 3em;">}</div> <div style="display: inline-block; vertical-align: middle;">beri-beri.</div> </div>
Beri-beric residual	<div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle;">cardiac, motor, sensorio-motor, or vaso-motor</div> <div style="display: inline-block; vertical-align: middle; font-size: 3em;">}</div> <div style="display: inline-block; vertical-align: middle;">paralysis.</div> </div>

Chronic beri-beri as a classifying term for cases of residual paralysis was avoided, because it implies that the causal agent is still at work. Post-beri-beric paralysis was avoided, because it implies that the atrophic paralysis of the disease followed some morbid constitutional state, minus paralysis. I have drawn attention to some striking analogies between beri-beri, as I conceive it, and diphtheria, principally that beri-beri as diphtheria appears to be due to a bacillus which multiplies locally in the vicinity or actually in a mucous surface, and produces its remote effects on the nervous system (constant in beri-beri, casual in diphtheria, however) through the agency of an extracellular neuro-toxin. Some commentators on my views, forgetting that there is no exact analogy in Nature, have, nevertheless, converted my analogy into an exact parallel. In doing so they accuse me of stating that beri-beric paralysis is always post. Above I have restated my position in this matter, I hope clearly and beyond further misconception. Perhaps the following graphic illustrations will make more clear this conception of beri-beri:—



KEY:—AA, Health line; BB, death line; C, prodromal stage of more or less marked gastro-duodenal symptoms; D, more or less

well-marked gastro-duodenal syndrome, suggesting multiplication of specific bacillus, elaboration of its toxin and absorption of it into blood stream, with consequent poisoning of neuronal terminations; O, first evidence of neuronal poisoning developing suddenly into acute pernicious beri-beri (E), which ends rapidly in death at (B), into acute and subacute beri-beri (F and R), which end in recovery at (P); G, combined gastro-duodenal and acute neuronal symptoms making up beri-beri proper, or the acute disease; H, more or less rapid passing of the acute poisoning of the neurones into an inertia degeneration, which occurs in a large number of cases, thus constituting the (KK), beri-beric residual paralysis; L, termination of the residual paralysis in death from cardiac exhaustion or some intercurrent affection; M, termination of residual paralysis in recovery; N, continuation of the residual paralysis indefinitely.

Above I have spoken of this theory, pathology, and classification of beri-beri as generally applicable. Does it, however, apply to those cases of beri-beri which follow parturition, surgical and other wounds, and which occur in children at the breast of mothers suffering from the acute disease. I have already answered this question elsewhere, but it may be restated. If the central fact of the theory is considered, namely, that beri-beri is caused by a specific bacillus locally confined, which produces its remote effects on the nervous system by means of an extracellular diffusible neuro-toxin, it will be clear that such an organism may act in a wound as well as in a mucous surface. Further, that acting in a parturition wound enough toxin may be absorbed not only to cause the acute disease in a mother, but also in her nursing child by secondary absorption. It might be urged that the experimental translation of human beri-beric blood to monkeys does not produce signs of beri-beri in them. But obviously it is one thing to translate a small quantity of blood from a human beri-beric to a monkey, and another, the almost constant translation of the beri-beric virus which would take place between an infected mother and her suckling infant. In the latter case the virus would be constantly reinforcing that previously absorbed, while in the former the small quantity of virus contained in the amount of blood that could be translated would be quickly diluted and neutralised.

The data on which all of these conclusions were based were published several years ago. Naturally it has taken time for other workers to confirm them *in toto* or in detail, or to deny them. Observations have, however, recently accumulated rapidly, and it is now proposed to examine them and see if they seriously impair my own and the reasoning founded on them.

REPLIES TO CRITICISMS.

Before proceeding, some ground must be cleared by reference to certain misstatements made by Dr. H. E. Durham in the *Journal of Hygiene*.

That author, by obviously personal strictures, attempted to cast doubt on the validity of certain special observations which I had made in the Federated Malay States. I have not before taken notice of his remarks, for it seemed to many that he was quite unfair. Perhaps if I state that Durham worked in my laboratory for nearly a year after my views on beri-beri had been submitted, and that on publishing what purported to be his own observations he failed to acknowledge the fact, and that, as is well-known to

those competent to discuss beri-beri, he, by his actions in the Federated Malay States, put himself out of court as a possible critic of beri-beri work done there, the matter may be brought to rest. I should not essay even this defence of my work against Durham's attacks were it not for the fact that some fair-minded critics have echoed him.

To turn now to more serious subjects. There has been considerable negative criticism of my conclusions as restated above.

Dangerfield's extensive brochure on beri-beri, published in Paris, 1905, is on the whole a negative comment on my views, inasmuch as he has submitted data on which he affirms that beri-beri is essentially a bacteræmia. He puts forward a micrococcus as the form of organism that exists in the blood stream and causes the disease. In 1900-1901 I made fairly exhaustive research of the blood of all classes of beriberics, and failed to find an organism in the flowing blood. Dr. C. W. Daniels ("Observations in the Federated Malay States on Beri-beri," London, 1906) has more recently made a similar research which was wholly negative. I shall shortly record an even later examination of the peripheral blood of acute beriberics by Wise, in which no organism of any kind was found. Finally, Drs. Hunter and Koch ("A Research into the Etiology of Beri-Beri," Hong Kong, 1906) have published a very thorough observation of the blood of beriberics, and have made inoculation experiments which show conclusively that beri-beri is not a bacteræmia. On the whole, Dangerfield's conclusion, and with it his negative evidence against my view that beri-beri is originally an acute toxæmia, beginning in a local primary lesion, cannot be accepted.

Dr. C. W. Daniels has put forward some negative criticism of my view of the nature of beri-beri. Unfortunately it is founded on an entirely erroneous conception of both my working theory and classification of the disease. Daniels credits me as follows: "Dr. Hamilton Wright goes so far as to propose the limitation of the term beri-beri to the intestinal condition, and to describe what is at present known as beri-beri as post-beri-beric neuritis."

I have not, of course, proposed any such limitation of the term beri-beri, nor have I ever used the wholly misleading term, post-beri-beric neuritis. It is not necessary to repeat what I have restated above on this side of the beri-beri question. Having mistaken my words, Daniels would controvert my views as to the nature of beri-beri by evidence which, properly interpreted, seems to me to only support the latter. For instance, he states: "In cases admitted with beri-beri, loss of appetite is common, and vomiting occasionally does occur; while distension of the epigastrium is quite a feature in the diagnosis. As these cases have quite other definite symptoms of the disease, and had usually been ill for several days, the symptoms were during the early stages of ordinary beri-beri and not during a prodromal stage."

I have never claimed more for the early, acute stage of beri-beri. Had Daniels read me clearly, he would have seen that the gastro-duodenal symptoms of his cases were part of what I have termed acute beri-beri. Had he seen his cases early enough he would probably

have found, as others as well as myself have pretty constantly found, that the gastro-duodenal symptoms were prodromal, as well as an accompaniment of acute beri-beri. His conclusions on this important point would then no doubt have chimed with mine, that beri-beri onsets with a gastro-duodenal syndrome, indicating the probable site of action of the specific cause.

In a further criticism of my view as to the primary lesion of beri-beri, Daniels submits a singular pathological conception. He states that the lesion of the gastro-duodenal mucosa in acute beri-beri, which he appears to have found pretty constant, is "not of an inflammatory nature such as we should expect to find in a primary lesion, but such as occur as secondary lesions, hæmorrhages, and congestions."

This view is not borne out by any published evidence that Daniels made an acceptable examination of the gastro-duodenal mucosa of acute or other beriberics. He appears to have autopsied thirty-four cases of beri-beri, thirteen of which exhibited ecchymoses and congestions of the gastro-duodenal mucosa ("The Diseases of British Malaya," Studies from Institute Medical Research, F.M.S., vol. iii., part 1). He does not claim to have been informed on the clinical histories of these cases, and there is no detailed statement of the microscopical appearances of their gastro-duodenal mucosa. I maintain that one may be grossly misled by the mere macroscopical observation of any morbid organ, and that no one is competent to generalise on such data. I may be wrong, but I am nevertheless forced to conclude that Daniels' criticism, as just quoted, is based on what he has read into my very detailed description of the macroscopical and microscopical state of the gastro-duodenal mucosa of many cases of acute beri-beri whose clinical history was known and given.

I hoped that I had made it perfectly clear that the chief lesion in the gastro-duodenal mucosa of acute beri-berics is a necrosis. There is, besides, more or less precipitation of fibrin, some small-celled and polynuclear leucocytic invasion, and spots and rings of brilliant congestion due to dilatation of capillary terminations. Actual hæmorrhages are rare, and just as rarely there may be extensive hæmorrhagic erosions. Mucosal erosions may, however, be common. Ulceration I have not seen.

According to the singular pathological conception enunciated by Daniels, this lesion in acute beri-beri, and the essentially necrotic lesions of diphtheria, cholera and tetanus, cannot be primary. It does not appear to me that Daniels' conclusion on this point can be accepted.

Daniels and others would attribute what I regard as the primary lesion of beri-beri to the action of a virus on the vagal terminations in the gut, without attempting to account for the early selective action of the poison. By similar reasoning, did we not know better, we might account for the primary lesion of diphtheria as due to the action of a virus on the neuronal terminations in the palate, pharynx and larynx. It appears to me to be better pathology to reason that, given a constant primary lesion caused by a neurotoxin-producing bacillus, it will be the neuronal terminations distributed to the site of the primary lesion

which will in time first succumb to the effects of the toxin.

The rest of Daniels' views as to the etiology, &c., of beri-beri are almost purely speculative, and so do not call for reply. He does not appear to have been able to watch the disease develop in healthy subjects, and his limited observations on morbid anatomy do not seem to have been made with a knowledge of the clinical history of his cases. He, however, arrives at an important general conclusion after examination of ground which I had thoroughly explored, namely, that "beri-beri is an infectious disease. As a rule a short period of incubation and a period of exposure of less than three months is requisite for full development of the disease where the 'endemic index' is high."

It will shortly appear that this general conclusion to which I was forced, to which Daniels has been forced after an examination of much data collected by others, and to which observers like Scheube adhere, is denied *in toto* by Hunter and Koch.

DRS. HUNTER AND KOCH'S RESEARCHES.

The most ambitious recent attempt to add to our knowledge of beri-beri is that made by the just referred to authors, Drs. Hunter and Koch, in "A Research into the Etiology of Beri-beri," Hong Kong, 1906.

These observers have canvassed the whole issue as laid down in my own investigations of the disease. It will be well to continue this line in my reply to their criticisms.

First in regard to the question of etiology. The above authors attempt to show that beri-beri is not an acute infectious disease. The first facts submitted are in a description of "An Outbreak of Beri-beri in the Po Leung Kuk." A mild form of the disease was not brought under control by "thorough and complete disinfection of the buildings. This was carefully done by the staff of the Sanitary Board, and the walls were completely lime-washed thereafter, and the floors scrubbed with a solution of strong carbolic acid." Because these sanitary measures were ineffective, Hunter and Koch conclude that beri-beri is not infectious in nature. Of course, so sweeping a conclusion is not warranted by the facts of the case. The observers do not appear to have disinfected the clothes or bedding of the inmates. They make no mention of having corrected the personal hygiene of the latter, an important matter when there was, as in this instance, an overcrowding of Orientals. The food supply does not appear to have been examined for *matrices morbi*, and during the continuance of the outbreak no effort was made to prevent new arrivals from introducing new infection from some endemic focus outside the Po Leung Kuk.

In all observations made in the Kuala Lumpur gaol, which Hunter and Koch would refute, the circumstances just enumerated were carefully looked to. The Kuala Lumpur observations extended over a period of more than two years altogether. The focus of infection (granting infection for the time being) was by a process of rigid exclusion narrowed to the cells of the gaol, and finally to certain of these cells almost alone. It will be clear, therefore, that Hunter and Koch's observation in this instance was inadequate to exclude beri-beri from the category of infectious diseases.

To clinch what Hunter and Koch regarded as a capital fact against the infectious nature of beri-beri, they proceeded to repeat my observation that monkeys may contract beri-beri when placed in a focus of the disease.

"Description of the Experiment A, 1-11-111. The rooms of the Po Leung Kuk, in which the majority of cases of beri-beri had occurred, were reserved for this test. The rooms were left in exactly the same condition as when they were used by the inmates of the Po Leung Kuk. Two monkeys were placed in each room, and in order to facilitate the onset of the disease the windows of the rooms were kept shut, and the light excluded as far as possible."

The monkeys, after a prolonged incarceration, did not develop beri-beri. Hunter and Koch, therefore, conclude that "The incarceration for months of monkeys in rooms presumably infected with the so-called beri-beri virus failed to induce the occurrence of the disease in them. We were unable to confirm the results of Hamilton Wright."

It must be plain to even the most casual reader that this attempt to work along the lines of my monkey experiment was a failure. The conditions of Hunter and Koch's experiment were almost indefinitely wide of the conditions under which my own observation was carried out in the Kuala Lumpur Gaol. As shown above, Hunter and Koch had by no means proved that it was the living-rooms of the Po Leung Kuk (in which they confined their monkeys) which contained the virus of beri-beri, as had been proved in regard to the cells of the Kuala Lumpur Gaol. Further, they were dealing with an institution in which only the mildest type of beri-beri had been observed, while the Kuala Lumpur Gaol had for years been a veritable hotbed of the most severe type of the disease. For instance, in ten or twelve of the Kuala Lumpur cells there was placed as many healthy Chinamen who had been roving the country as gang robbers. These men never left the cells from the time of incarceration until they contracted beri-beri. Inside a month eight of the Chinamen contracted a most severe type of acute beri-beri, while one of them died of the acute pernicious form. Again, Hunter and Koch incarcerated their monkeys in rooms with a floor space ranging from 401 to 902 square feet. The cells of the very lethal Kuala Lumpur Gaol, in which my observation was made, had a floor space of about 50 square feet. This alone was a great difference in the conditions of the two experiments, even granting that Hunter and Koch had proved by exclusion that the rooms of the Po Leung Kuk were infected. All facts considered, it does not appear that Hunter and Koch's observation on monkeys was well planned, or that it was adequate to exclude any part of my own. It certainly does not exclude beri-beri from the category of the acute infections.

Under the heading of "Feeding Experiments, B, 1-111," these observers make the following statement, and then, on the contained reasoning, proceed with certain experiments: "As certain observers, as Pekelharing and Winkler, Gerrard and others, claim to have found micrococci, &c., in the blood stream of beri-beri patients, feeding animals with the blood of such cases seemed to afford the best opportunity

for a successful mode of conveyance of beri-beri from man to animal. By this method the organisms said to be present in the blood would reach that part of the gut, namely, the gastro-duodenal mucosa, alleged to be the site of primary beri-beri infection, and in susceptible animals set up the disease. It seemed to us that, by resorting to such experiments, the question as to the presence of a definite primary lesion in beri-beri, and our hopes of obtaining positive evidence of the transmission of the disease to monkeys by this method were strengthened by the publication of Wright dealing with natural infection in monkeys incarcerated in presumably infected prison cells."

The reasoning of this paragraph does not appear sound to me. In effect, Hunter and Koch state that A. has a theory that beri-beri is caused by a bacillus which never extends into the blood stream, but acts locally in a mucous membrane, and produces its remote effects by means of an absorbable toxin; that is, the disease is a toxæmia. B., on the contrary, has a theory that beri-beri is caused by a micrococcus which gains the blood stream through the skin; that is, the disease is a bacteræmia. C., however (Hunter and Koch), propose to prove that A. is wrong in regard to his locally acting bacillus by feeding animals with blood supposed to contain the skin-piercing micrococcus of B.

Comment on such reasoning is needless, and Hunter and Koch's "Feeding Experiments, B, 1-111," based on it, do not call for attention.

Hunter and Koch now proceed along more rational lines and attempt to show that animals fed with gastro-duodenal mucosa of fatal acute beri-beries fail to exhibit signs of the disease.

Their feeding experiments, E, 1-11-111, were made on monkeys by feeding one animal in each experiment with *one bolus* composed of boiled rice and broken-down gastro-duodenal mucosa. No signs of beri-beri followed after feeding with *one bolus*. Yet the authors conclude that the experiment was negative, so far as my view is concerned that beri-beri has as its primary lesion a gastro-duodenitis. The experiment was well conceived, but nevertheless wholly inadequate as the basis of any conclusion, in regard to beri-beri. The experimenters should have borne in mind the feeding experiments made with Koch's comma.

A further attempt was made by Hunter and Koch to induce beri-beri in animals by feeding them with spleen pulp, broken-down liver, medulla, cord, brain blood, &c., of beri-beries (feeding experiments, B, 11, pigs I. to VI. and one sheep). The amount of such materials that could be given to animals was small, of course, and the boluses were seldom or never repeated. No signs of beri-beri appeared. Therefore, conclude the authors, beri-beri may not be contracted through the gastro-duodenal mucosa. So far as I know the organs with which these animals were fed have never been claimed by me to contain the bacillus of beri-beri. I have always maintained that the bacillus does not extend within the body. It must be plain, therefore, that this attempt to induce beri-beri was illogical, and that no fair deductions can be based on it.

It is gratifying to turn from Hunter and Koch's illogical feeding experiments to some of their really

valuable inoculation work. After a repetition of observations made by the writer several years ago, more recently by Daniels, and still later, as I shall show elsewhere, by Wise, that in no stage of beri-beri is there a bacteræmia, Hunter and Koch conclude as follows: "The repeated sterile result after inoculating bouillon and agar tubes with appreciable quantities of freshly flowing (beri-beri) blood, demonstrates more or less clearly the non-bacteræmic nature of beri-beri." This does not, of course, prove that beri-beri is not an acute infection. It simply proves that it is not of the bacteræmic type of infection.

The authors clinch this observation by a failure to induce beri-beri in monkeys, sheep, calves, rabbits, &c., by inoculating them with beri-beri blood and vaccinating them with rubbed up beri-beric organs. But these experiments do not exclude beri-beri from the category of the acute infections. They only prove that beri-beri is not a bacteræmia. They have only a remote relation to my own view that beri-beri is an acute toxæmia. On this view the remote effects of the locally acting bacillus are induced by an absorbable toxin which circulates in the blood. Hunter and Koch might have hoped to induce some signs of beri-beri in their animals by carrying over in blood from beri-beries an efficient quantity of the circulating toxin. The small amounts of blood they were forced to use, however, would put out of consideration any attempt of this kind.

Where, as the result of their experimental observations, Hunter and Koch conclude that by culture no organisms are to be found in the blood stream of beri-beries they are correct and corroborate older observations of the same order. They are also correct when they conclude that beri-beri cannot be induced by the translation of beri-beri blood to lower animals, provided that they hold to the idea of a bacteræmia as the cause of beri-beri. When, however, on such data they conclude that beri-beri is not a toxæmia caused by a locally acting organism, they go astray. They do not appear to distinguish between the idea of a bacteriæmia and a toxæmia, or so it would appear from the above quotation from their work. They appear to have forgotten, too, that any quantity of a toxin which they might translate from the human to a lower animal would be quickly diluted and probably neutralised by the body juices of the latter. It is quite a different matter in the case of a child suckling a beri-beric mother, as mentioned above.

I do not think that any one will, after a careful reading of Hunter and Koch's experiments, and the reasoning on which they were largely founded, conclude with them as follows: "These experimental researches, negative though they be, possess, in our opinion, great value, as they practically prove (how may a negative experiment practically prove?), in opposition to H. Wright and others, that in beri-beri we are not dealing with an infectious disease, but one with an entirely different etiology."

Turning now from Hunter and Koch's etiological to their clinical observations, it would appear that the latter were confined to the inextensive subacute outbreak in the Po Leung Kuk. Even in this experience of the disease we are not furnished with the particulars of individual cases. Only very wide

generalisations are made. There seems to have been no attempt made to study the disease under that prime condition, rest or comparative rest, which is demanded by the nature of the affection. The patients wandered at will. It is an axiom that the true features of an acute neuritis are obscured by adding to the original symptoms others due to use of the damaged neurones. I have shown that in onset, course, and termination beri-beri presents clinically many features of an acute infection. Hunter and Koch's clinical observations do not help us to form an opinion one way or the other on this question.

In regard to the pathology of beri-beri Hunter and Koch state: "The descriptions recently given by Hamilton Wright, Mott, and others are sufficiently extensive and minute to gratify even the most curious of pathologists."

Why, then, did they not accept that pathology and its classification into the acute and residual categories, a pathology which, so far as my own work was concerned, was based on not only extensive *post-mortem* examinations, but also on a thorough study of the cases before death. My attempt was to put the morbid anatomy of beri-beri on a scientific basis, to co-ordinate the appearance of an organ or set of neurones with the symptoms expressed by them during life. For years beri-beri cadavers had been conscientiously studied by Malcommsen, Scheube, Baelz, Ellis, and others; the only fault in their observation was that the lesions found were not brought into relation with the clinical signs at the time of death. Statements were made in regard to the heart, muscles, &c., that appeared to be positive for any stage of the disease. The literature was full of such general conclusions as that there is always cardiac enlargement in beri-beri; that the somatic muscles are greatly atrophied, &c. My own efforts showed conclusively that the pathologic lesion of beri-beri varied with the stage of the disease, and that the lesion of the acute stage of the disease was an entirely different affair from that of the residual stage of the disease (*vide supra* for an outline).

It appears to me that after the frank admission of Hunter and Koch that pathological curiosity had been satisfied, they should have refrained from tabulating their morbid anatomy without any relation to the clinical histories of their cases. They state: "It is to be regretted that in the majority of cases—cadavers—examined a history of illness was not ascertainable. This was due to the fact that most of the bodies sent for section were found in the streets, in deserted houses, or on the hillsides." Only vague generalisations may be made from morbid anatomy obtained under such conditions. And so we find that Hunter and Koch have given us the pathology of beri-beri as it may be found in any old text-book article on the disease. It cannot be accepted on their clinical or *post-mortem* work any more than on their etiological observations that beri-beri is not an infectious disease.

There is but one other point in Hunter and Koch's work that should be attended to. Writing on the classification of beri-beri, they remark that beri-beri exists in two forms: "the dropsical, moist or wet form, and the atrophic or dry form. Beri-beric residual paralysis is a term which has been used in an analogous

manner, and with a similar meaning to diphtheritic paralysis. The pathology of the diseases being different, the comparison does not hold, and any attempt to introduce new varieties, names, &c., is to be deprecated."

Of course the disease does not present itself in two varieties. It presents itself in a multiplicity of varieties, depending upon the extent to which the different kinds of neurones are poisoned in the acute form, and the degrees of inertia degeneration which develop in them if they do not recover on the elimination of the virus of the disease. The terms wet and dry were tentatively used over fifty years ago, before the pathology of beri-beri could be satisfactorily studied. For Hunter and Koch to continue to use them is to confuse the subject, just as they confuse it by stating that the morbid anatomy is so and so without any relation to the clinical facts and stage of the disease. Further, the term beri-beric residual paralysis was not proposed on the assumption stated by Hunter and Koch. It was proposed for the exactly opposite reasons. It ought to prevent any one confusing the residual paralysis of beri-beri which follows a previous acute palsy with the post-paralysis of diphtheria which is not post to a previous different sort of paralysis, but to certain local and constitutional symptoms which make up the disease. The classification which was proposed for beri-beri (*vide supra*) was based on clinical and pathological data studied in close relation to one another. Hunter and Koch may regard it obliquely; yet they testify to its soundness by constantly using it in their description of experimental work, and in the one clear statement they make on the pathology of beri-beri.

Taking all of the above criticisms into consideration, they cannot be said to weaken the views which I have expressed (be they right or wrong) as to the nature, cause, course and termination of beri-beri.

MALIGNANT ANTHRAX ŒDEMA IN CENTRAL AFRICA.

By A. YALE MASSEY, B.A., M.D., C.M.(Tor.).

Medical Officer, Tanganyika Concessions, Ltd.

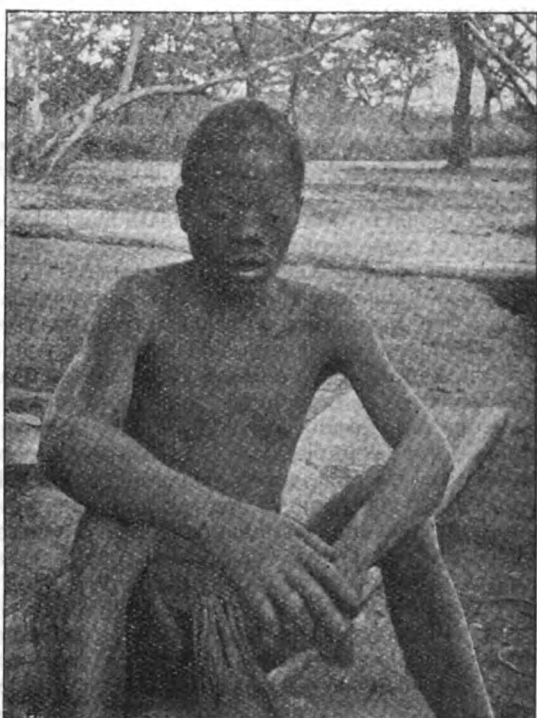
ON March 14th, 1906, a black, aged 18, employed on the shed gold, carrying dirt in a bark basket, appeared at the hospital complaining of pain in his neck and shoulder. Examination revealed a slight general swelling above the right clavicle, and a very considerable swelling and œdema of the adjoining shoulder extending almost to the elbow. There was no abrasion of the skin. Temperature, 103° F. The patient did not appear to be very ill, his main trouble being that he could not use his right arm. During the next two days œdema increased and extended to the fingers which became very tense. The temperature fell to 101° F. 18th: The patient, instead of coming for treatment, went hunting mushrooms for food, saying he was all right. 19th: Proptosis of right eye and swelling of right face. 20th: Convulsions general, resembling epilepsy every couple of hours; breathing heavy; temperature normal. 21st: Proptosis marked in both eyes; left breast slightly swollen. 22nd: Unable to close the eyes completely; corneas dry and anæsthetic; œdema of arm and hand slightly

reduced. Convulsions very frequent and always on being disturbed. No evidence of disease in the lungs. 23rd: Death.

Autopsy.—Decomposition was rapid. Serous cavities contained small amounts of fluid. Marked œdema of right arm, shoulder and neck. Spleen not enlarged. Deep glands of the right side of the neck much engorged.

Diagnosis.—The anthrax bacillus was not found in the blood before death, after more or less careful search. Fluid from the engorged cervical glands, after death, showed numerous anthrax bacilli, and mice inoculated with this fluid died in five days, their blood showing innumerable bacilli of anthrax.

Treatment.—Symptomatic with good feeding, stimulants and quinine. It is regretted that a supply



Photograph taken on March 21st, or eighth day of disease.

of Selavo's anti-anthrax serum,¹ which has been used with such marked success in England and on the Continent, was not available.

Conclusions.—This is the first case of anthrax that I have diagnosed in a six years' practice in Central Africa. It is quite possible that some sudden deaths of unknown cause among natives may have been due to the *Bacillus anthracis*. That there should be marked external œdema without the pustule seems to be contrary to the rule. Infection may have been through the mucous membranes of the nasal fossæ, the mouth or the pharynx, to the deep cervical glands.

A noticeable feature was that the patient never took his illness seriously, and even when in a critical condition did not appear to feel very ill.

¹ Legge. Milroy Lectures. *British Medical Journal*, March 18th, 1905.

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THE

Journal of Tropical Medicine

AUGUST 15, 1906.

THE SIVEWRIGHT PRIZE.

THE prize given by Sir James Sivewright, K.C.M.G., M.A., LL.D., has been awarded to John D. Gimlette, M.R.C.S., L.R.C.P., of the Malay Native States, for his contribution entitled "The Puru of the Malay Peninsula," published in the JOURNAL OF TROPICAL MEDICINE on May 15th and June 1st, 1906.

THE BELILIOS PRIZE.

THE prize given by Raphael Belilios, Esq., has been awarded to Joseph Herbert Ford, B.S., A.M., M.D. (Captain, Assistant Surgeon, U.S. Army; Professor of Diseases of the Tropics in the Medical Department, Columbian University, Washington, D.C.), for his contribution entitled "The Treatment of Dysentery," published in the JOURNAL OF TROPICAL MEDICINE, July 15th, 1904, and to J. G. Berne, Captain, R.A.M.C., for his contribution entitled "The Treatment of Dysentery," published in the JOURNAL OF TROPICAL MEDICINE, August 1st, 1904.

THE ETIOLOGY OF BERI-BERI.

THE categorical reply of Dr. Hamilton Wright to critics of his well-known theory as to the nature, cause, course and termination of beri-beri, is interesting reading. That it will carry conviction to unbelievers is another matter; but all will agree that his formulated conceptions bear a scientific impress which cannot be passed over slightly or without careful consideration. Drs. Hunter and Koch, of Hong Kong, have given the matter their earnest attention, and that they have approached the subject in a truly scientific spirit is abundantly apparent from the detailed criticism of their published report which Dr. Hamilton Wright has found it necessary to bestow upon their work.

Hamilton Wright's contention is well set forth in the article we publish to-day, and we refer our readers to the opening paragraphs of his contribution for a further enunciation of his views. Shortly, it may be stated, that according to Dr. Hamilton Wright beri-beri is, in its origin, an acute infectious disease. It is caused by a specific bacillus having its habitat in the gastro-duodenal tract; the bacillus induces a necrosis of the mucosa of that part of the alimentary canal and "a toxin is developed, and the syndrome, together with the rapidly spreading acute poisoning of the sensorio-motor and autonomic neurones, make up acute beri-beri, or beri-beri proper." This is a clear, definite and logical position, and only requires for its establishment clinical and pathologic confirmation. This confirmation Dr. Wright maintains that he has established, and his opinion is shared by not a few.

Drs. Hunter and Koch tested Dr. Hamilton Wright's views on beri-beri by extensive pathological and bacteriological investigations, and their conclusions are:—

- (1) There is no evidence that beri-beri is an acute specific infectious disease.
- (2) No micro-organism, of the hitherto described forms, has been found in any organ or tissue of a beri-beri patient or cadaver which could be brought into causal relationship with the disease.
- (3) Experimentally it has been found impossible, by any method, to call forth the disease in any animal.
- (4) In our experience true beri-beri does not exist in monkeys infected either naturally or experimentally.
- (5) Beri-beri, as the result of our investigations, would appear to be non-micro-organismal in nature. We are inclined to bring some chemical poison into causal relationship with the disease.
- (6) Our results are in direct opposition to those obtained by Dr. Hamilton Wright.

How the conclusions are answered and dealt with by Dr. Hamilton Wright will be found in his article published in the current issue.

That beri-beri is a serious malady in Hong Kong there can be no doubt, for Dr. J. C. Thomson, who is in charge of the Tung Wah Hospital, Hong Kong, states that "Beri-beri is a most deadly disease, and is now (1905 report) alarmingly prevalent in the colony."

A STUDY OF THE CAUSE OF SUDDEN DEATH FOLLOWING THE INJECTION OF HORSE SERUM. By Milton J. Rosenau and John F. Anderson, Hygienic Laboratory, United States Public Health and Marine-Hospital Service.

In their introduction to this enquiry the authors state that: "It has long been known that the blood of certain animals is poisonous when transfused or injected into certain other species.

"Many instances might be cited showing that the blood serum of one animal has poisonous properties when injected into an animal of another species. But the blood serum of the horse apparently lacks such poisonous action. Very large quantities of the blood serum of the horse may be injected into man, rabbits, guinea pigs, and many other animals without serious inconvenience, except occasionally a slight reaction at the site of inoculation.

"In a certain proportion of cases the injection of horse serum into man is followed by urticarial eruptions, joint pains, fever, swelling of the lymph nodes, cedema, and albuminuria. This reaction, which appears after an incubation period of eight to thirteen days, has been termed by Pirquet and Schick the 'serum disease.'

"In exceptional instances sudden death has followed an injection of horse serum in man.

"These studies were taken up in October, 1905, in order to throw light upon the cause of this unfortunate accident. We have shown that ordinarily horse serum is a comparatively bland and harmless substance when injected into certain animals; but these animals may be rendered so susceptible that an injection of horse serum may produce sudden death or severe symptoms. For example, large quantities of horse serum may be injected subcutaneously or into the peritoneal cavity of a guinea pig without apparently causing the animal the least inconvenience. However, if a guinea pig is injected with a small quantity, say $\frac{1}{250}$ c.c., of horse serum and after the expiration of a certain interval is again injected with the horse serum the result will probably be fatal. The first injection of horse serum has sensitised the animal in such a way as to render it very susceptible to a toxic principle in horse serum. It is probable that when the guinea pig is injected with the first, or sensitising, quantity of serum the strange proteid contained in the horse serum develops in the body of the guinea pig 'antibodies' which, when brought into contact with more horse serum given at a second injection, produce either a union or a reaction, which causes the toxic action.

"A certain time is necessary to elapse between the first and second injections of horse serum before this toxic action is able to manifest itself. This 'period of incubation' is from ten to twelve days, and corresponds suggestively with the period of incubation of the serum disease which Pirquet and Schick place at eight to thirteen days.

"Guinea pigs may be sensitised with exceedingly small quantities of horse serum. In most of our work we used quantities less than $\frac{1}{250}$ cc. and we found in one instance that 1,000,000 cc. of horse serum was sufficient to render a guinea pig susceptible.

"It also requires very small quantities of horse

serum, when given in a second injection, to produce poisonous symptoms. One-tenth c.c. injected into the peritoneal cavity is sufficient to cause the death of a half-grown guinea pig. One-tenth c.c. of horse serum injected subcutaneously is sufficient to produce serious symptoms. The fact that this toxic action may be developed by such small quantities of serum, and the fact that exceedingly small quantities are sufficient to produce symptoms and death upon a second injection, *a priori* places both the sensitising and the toxic principle in the horse serum in the 'haptin group' of substances in the sense used by Ehrlich.

"A still further indication that the side-chain theory in its broadest sense may be applicable is the further fact that immunity may be produced against the toxic action by multiple injections of the serum.

"While at first we thought that diphtheria antitoxin had some relation to this action, we are now able to state positively that it has nothing whatever to do with the poisonous action of horse serum; further, that diphtheria antitoxin in itself is absolutely harmless. The toxic action which we have studied is caused by a principle in normal horse serum and is entirely independent of the antitoxic properties of the serum."

LONDON SCHOOL OF TROPICAL MEDICINE.

COLONEL KENNETH MACLEOD, I.M.S., M.D., LL.D., Hon. Physician to the King, will deliver the address at the opening of the Winter Session of the London School of Tropical Medicine, on October 8th. His Grace the Duke of Marlborough, the President of the Seamen's Hospital Society, with which the School of Tropical Medicine is affiliated, will take the chair on the occasion.

His Grace has also consented to preside at the annual dinner of the staff and students on the evening of the day of the address.

21ST SESSION—JULY, 1906.—*Examination Result.*

Capt. L. P. Stephen, I.M.S., M.B., Ch.B. (Aberd.), D.P.H. (Lond). With distinction.

L. A. Prins, L.M. & S. (Ceylon), L.R.C.P. & S. (Edin.), (Colonial Service). With distinction.

Capt. A. W. Cook Young, I.M.S. M.B., Ch.B., D.P.H. (Aberd.). With distinction.

Major E. Wilkinson, F.R.C.S. (Eng.), L.R.C.P., D.P.H. (Camb.). With distinction.

W. S. Allan, M.B., Ch.B. (Glas.).

R. T. Booth, M.B., B.Ch. (R.U.I.).

I. McW. Bourke, M.R.C.S., L.R.C.P. (Colonial Service).

John Cross, M.B., Ch.B. (Glas.) (Colonial Service).

B. M. Flood, L.R.C.P. & S. (Edin.) (Colonial Service).

E. N. Graham, L.R.C.P., F.R.C.S. (Edin.)

E. M. Nicholl, M.B., C.M. (Edin.)

J. Ottley, L.R.C.P. & S. (Edin.) (Staff-Surgeon R.N. retired).

E. C. Peake, M.B., Ch.B. (Edin.).

E. Robledo, M.D. (Columbia, S. America).

Miss L. G. Thacker, M.B., B.S. (Lond.)

Capt. L. L. G. Thorpe, R.A.M.C., L.S.A.

A. B. Tighe, M.B., B.Ch. (Dublin).

W. M. Wade, M.B., B.Ch. (Dublin).

Miss K. Wyss, M.D. (Zurich).

Abstract.

HUMAN TRYPANOSOMIASIS. By Dr. Ayres Kopke, Professor at the Lisbon School of Tropical Medicine. Paper read before the Fifteenth International Medical Congress, Lisbon, April, 1906.

Professor Ayres Kopke here states the results of his researches as to the relative value of trypanosomes and of micro-organisms as causes of the symptoms and histo-pathological lesions peculiar to sleeping sickness.

He first continued the verification of the constant presence of trypanosomes in all cases of sleeping-sickness, and the identity of the trypanosomes, which cause the Gambia fever and sleeping sickness, and then endeavoured to ascertain whether the former disease was merely the first phase of the latter, and whether the appearance of the severe nervous symptoms was due only to the protozoon, or if the later infection by diplo-streptococci, aided by the first-named parasite, was really the determining cause of the final phase of the disease. Lastly, as the most important desideratum in so fatal a disease would be that of discovering a substance which would act on the *Trypanosoma gambiense* precisely as quinine acts on the malarial parasite, it was necessary to make therapeutic experiments on animals previously infected, on the lines of research adopted by Ehrlich, Shiga, Laveran and Wolferstan Thomas. The total number of cases observed by Kopke amounted to 56, of which 3 were not diagnosed as sleeping sickness. Of the 53 cases, trypanosomes were present in all of them; 40 were punctured in the lumbar region, and all showed trypanosomes in their cerebro-spinal fluid; 38 were clinically studied up to the time of death, and 36 were examined *post mortem*, and in all of these latter cases sections of the nervous centres showed leucocytic infiltrations round the vessels. Bacteriological researches were also made during life and after death; the cultivating media included bouillon and ascitic fluid, Kiefer's medium, Martin's bouillon, Martin's gelatine and simple gelatine.

During life only one case (and that only shortly before death) showed diplo-streptococci. After death, these streptococci were searched for in the sub-arachnoid exudation of the brain, the fluid in the ventricles, the heart's blood, and sometimes in the fluid obtained by lumbar puncture; they were found in 51.4 per cent. of the cases.

As regards treatment, up to the end of May, 1905, the patients were given cacodylate of soda, adrenalin, iodine and collargol, but without any favourable result. After this date, he prescribed trypanroth, alone or in combination with arsenite of soda or with atoxyl. Latterly he restricted himself to the use of the last-named method, as suggested by Thomas. Under this treatment, those patients who were not in an advanced stage of the disease showed great improvement (cessation of fever, less somnolence, increased muscular energy, more active nutrition), and the trypanosomes disappeared from the peripheral blood and from the ganglionic juice, although they were still present in the cerebro-spinal fluid.

The following are the conclusions arrived at:—

(1) In all the cases diagnosed as sleeping sickness the *T. gambiense* was invariably found.

(2) In the 40 cases on which lumbar puncture was performed, an examination of the cerebro-spinal fluid invariably revealed trypanosomes.

(3) In some cases, although the patients had trypanosomes in their cerebro-spinal fluid, marked nervous symptoms were not present.

(4) The search for diplo-streptococci during life, with one solitary exception, was negative, but after death 51 per cent. of the cases showed positive results in the blood and spinal fluid.

(5) None of the animals injected with the cerebro-spinal fluid showed the perivascular infiltrations in the nervous centres which are so constantly found in those patients who die from sleeping sickness.

(6) As regards the atoxyl treatment, a weekly hypodermic injection of 10 to 15 cc. of a 1 in 10 solution, constantly repeated for several months, showed a considerable improvement in the condition of the patients, but it is doubtful whether a cure can be obtained by this means alone. The number of trypanosomes is diminished in the blood and ganglionic juice, and the inoculation of animals may give a negative result; but trypanosomes still persist in the cerebro-spinal fluid, probably owing to the impermeability of the meninges to drugs, for which reason—

(7) Medicines—to be efficacious—should be simultaneously administered by hypodermic injection and by injection into the subarachnoid space immediately after lumbar puncture. Experiments are now being made with a 1 per cent. solution of lysol. J. E. N.

Reviews.

ILLUSTRATIONS OF BRITISH BLOOD-SUCKING FLIES, WITH NOTES. By Ernest Edward Austen, Assistant, Department of Zoology, British Museum (N.H.), 1906. Pp. 74, with 34 coloured plates. Printed by order of the Trustees of the British Museum, London, 1906. Price 25s.

This volume, which is obtainable at the British Museum (Natural History), Cromwell Road, London, S.W., and at several booksellers', is one of which the Museum authorities may be justly proud. The illustrations by Mr. A. J. Engel Terzi are excellent. It is impossible to speak too highly of Mr. Terzi's beautiful drawings. Scientifically correct in drawing, in proportion and in colour, the illustrations have been delineated with Mr. Terzi's usual care and exceptional skill, and a higher guarantee of their accuracy and completeness cannot be given. The text by Mr. E. E. Austen is written in an attractive manner and may be understood by one unskilled in the technicalities of biological nomenclature. The information collated in the volume is wonderfully wide, considering the few, the very few, people who do anything practically to advance this subject. To Lieut.-Col. J. W. Yerbury the Museum and Science generally is indebted for the devotion he has shown to advancing our knowledge of the Diptera, but we want many scores of persons imbued with Lieut.-Col. Yerbury's enthusiasm before we can be said

to have in any way perfected our knowledge of the subject. The volume before us should stimulate many men and women to take an intelligent interest in a subject which is aiding the medical profession to trace the origin, or at least the mode of transmission, of several of our most common ailments.

Correspondence.

THE TREATMENT OF "MALARIA ULCERS" BY LOCAL APPLICATIONS OF QUININE.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS.—Replying to the enquiry of "W. D. G." in the JOURNAL for April 2nd, 1906, as to the method of applying quinine to the so-called "Malaria Ulcers," I may say that the main object seems to be accomplished when the alkaloid (soluble or in solution) is brought into contact with the cleaned surface of the ulcer. Any soluble salt of quinine may be used, either dissolved in water and applied by means of a pledget of cotton wool, or dusted dry on the surface of the sore. The latter seems to be the most satisfactory procedure, for then the quinine dissolves slowly, and its effect is more prolonged. An important matter is to get the sore clean before applying the quinine, as the effect is otherwise nil. Salicylic acid is often useful in this preliminary cleaning up. Quinine should also be administered internally during the treatment of the sores.

A majority of our local "Malaria Ulcers" (which, by the way, have not been proven to hold any ætiological relation to malaria) will heal rapidly under treatment similar to that here described.

I remain, Sirs,

Yours, &c.,

Benguella, W. Africa,
June 20th, 1906.

CREIGHTON WELLMAN.

Obituary.

LIEUTENANT FORBES TULLOCH, R.A.M.C.

THE rapid termination of the trypanosomiasis infection in the lamentable case of this most promising young officer and investigator will come as an additional shock to all interested in tropical medicine. The duration of such cases is usually much more protracted, and though no cases of recovery can be recalled, it cannot be denied that recent therapeutic experiments on animals have been so promising that one felt entitled to retain some hope as long as life remained.

The case is a poignant illustration of the dangers that beset the investigation of diseases in general and of tropical diseases in particular, especially as it chances that only good fortune has saved another member of the Commission from a like fate. One of them, in fact, accidentally pricked himself with a capillary tube full of trypanosomes, but fortunately none of the latter can have entered the wound, as the entry of even a single parasite would presumably suffice to infect. While at Entebbe, Lieutenant Forbes Tulloch contributed to the *Transactions of the Royal Society* a valuable paper on "The Anatomy of Stomoxys," which would alone suffice to demonstrate his qualifications as a skilled investigator. The tragedy

of his death is, moreover, enhanced by the fact that the deceased officer married just before proceeding to Uganda, and hence leaves a young widow to mourn his loss. Lieutenant Forbes Tulloch received his medical education at St. Mary's Hospital, Paddington, and we cannot do better than close our notice by extracting from the pages of the *Hospital Gazette* the subjoined notice from the pen of a personal friend:—

"It is with deep regret that we note the sad death of Lieutenant Forbes Tulloch. He qualified in 1901 and went to South Africa as a Civil Surgeon, and in 1903 he obtained a commission in the Royal Army Medical Corps. Last year he went to Uganda as a member of the Commission for the investigation of Sleeping Sickness, and about four months ago he contracted this disease by wounding his hand with an infected knife. He was invalided home and was treated in the Queen Alexandra Military Hospital at Millbank, but the disease ran an unusually rapid course and he died on June 20th, at the early age of twenty-seven.

"We who remember him during his student days recall his good nature, his generosity and the geniality of his bearing, his character being such as made him ever one of the most popular of men amongst us. We remember, too, the enthusiastic way in which he worked at any subject, in which he was interested, such as micro-photography, to which he devoted much time and with conspicuous success.

"In a peculiarly sad and tragic way his life was cut short and his name added to the long and honourable list of those of our profession who have met their death at their noble calling. In him science loses a devoted servant, lost in her own service, and St. Mary's honours him for his life and for his death."

MAJOR H. W. ELPHICK, M.B., I.M.S.

We regret to have to record the death of Major H. W. Elphick, of the Indian Medical Service, at the comparatively early age of forty-one.

Major Elphick entered the service on September 30th, 1898, and arrived in India the following spring. From the first he withstood with difficulty the trying climate of the Plains of India, and he would have probably been better advised had he decided to abandon the attempt to cope with it.

His liking for India and his keen interest in the work, however, led to his disregarding repeated warnings, and struggling on where many men would have given in, it cannot be doubted that he has fallen a victim to the power of a will stronger than his frame.

Most of his service was passed in the Civil Department in the United Provinces, where he was well known and greatly liked, and his death will be deeply regretted by a large circle of friends.

For several years he was Civil Surgeon of Dehra Doon, the cooler climate of which, it was hoped, would enable him to continue his service. Unfortunately, this district is close to that powder magazine of Indian epidemics, the town of Hurdwar with its periodical religious fairs, so that the services of the Civil Surgeon of Dehra are often put into requisition during times

of danger. During the desperate efforts of the authorities to guard Hurdwar from the spread of plague by wholesale disinfection, a riot took place in which Major Elphick was brutally assaulted. Though not absolutely dangerous, his injuries were so grave as to have a most serious effect on the health of a man never strong at the best of times, and there can be no doubt that the final break up of his health was due to the injuries he received. He had to take sick leave, and failing to recover, was placed on temporary half-pay on March 6th, 1905, and died at Rugby, on May 20th, 1906. His death will be felt as a personal loss by all his old colleagues in the United Provinces, for he was a man of charming personality, who never made an enemy.

THE REV. RODERICK JOHN JOHNSTONE MACDONALD, M.D. EDIN.

THE Rev. Roderick John Johnstone Macdonald, M.D. Edin., of the Wesleyan Methodist Missionary Society, was killed in China by pirates on the West River of the Kwangtung Province. The boat on which he was travelling was attacked by river pirates; the captain was shot, and Dr. Macdonald, who was a passenger by the boat, went to his assistance: whilst attending to the captain's wounds, Dr. Macdonald was himself fatally wounded.

After graduating at Edinburgh, M.B., C.M., in 1881, and M.D. in 1884, Dr. Macdonald went to China as a missionary, and was stationed at Wuchow, in the Kwangsi Province. The hospital under his charge not only increased in size by his indefatigable exertions, but through his tact, skill, and untiring devotion attained to widespread repute throughout the southern provinces of China. In addition to his hospital work, Dr. Macdonald officiated at Wuchow as medical officer to the Imperial Chinese Maritime Customs and as surgeon to the British Consulate and gaol. A medical missionary of Dr. Macdonald's stamp is a valuable national asset, and his loss under so tragic circumstances brings home to us the risks that missionaries run, not only from disease in unhealthy parts of the world, but from the turbulent spirits that are ever ready to raise their hand against them from one cause or another. The sympathy for his widow and two young sons is sincere and widespread.

Notes and News.

THE Turkish Government contemplates building a hospital of 300 beds at Mecca. A dispensary already exists at Mecca, and it is intended to increase its scope of usefulness, and supply drugs gratuitously. Amongst other schemes for the benefit of the city and its pilgrims, an improved water supply is proposed.

AMONGST the Turks, in both Europe and Asia, spring blood-letting is extensively practised.

C. T. GRAYSON, U.S.A., has brought out a mosquito net for use in hammocks, termed the Grayson-Graeme hammock mosquito net.

THERE are 120 male and 180 female medical missionaries in India.

THE cocaine habit is growing to an alarming extent amongst both Hindus and Mahomedans in Delhi. Amongst all classes of the community, rich and poor, men and women, adults and children, the habit is said to be prevalent.

INDIAN MEDICAL SERVICE.—The following were the successful candidates at the examination for admission to the Indian Medical Service held on July 24th, and four following days:—

J. Taylor, M.B.; A. D. Stewart, M.B.; C. H. Cross; R. A. Chambers, M.B.; R. H. Bott, F.R.C.S.; N. N. G. C. McVean, M.B.; J. Morison, M.B.; S. G. S. Haughton, M.B.; F. W. Cragg, M.B.; N. S. Simpson; S. Singh; R. F. Hebbert, M.B.; J. F. James, M.B.; J. Smalley, M.B.; A. S. Leslie, M.B.; C. M. Roberts, M.B.; A. P. G. Lorimer, M.B.; W. M. Thomson, M.B.; H. B. Scott; and F. C. Fraser, M.D.

SURGEON-GENERAL GUBBINS is gazetted P.M.O. in India, *vice* Sir Thomas Gallwey, K.C.M.G., C.B., appointed P.M.O., Aldershot.

LADY MINTO's Fund for the Indian Nursing Association now amounts to Rs.25,000.

A TELEGRAM published elsewhere announces certain changes in the organisation of the Indian Medical Service. Since 1896 officers appointed to the Service have been allotted to the military area, though borne on one general list, and while liable in emergency to serve anywhere, are ordinarily employed in the areas to which they happen to be posted. In future the territorial allotment will be abolished, the three Presidency and General Lists of officers being amalgamated, but officials already in the Service will, as far as possible, be employed in the areas for which they are eligible under existing conditions. Future recruits to the Service will be liable to military employment in any part of India, but for civil employment they will be allowed, according to their position in the examination lists, to elect for service in certain specified areas, though in emergency they will be liable for service anywhere. —*Pioneer Mail*, July 20th, 1906.

INOCULATION IN RANGOON.—Since the issue of the circular last week by the Rangoon Municipality plague inoculation is being accepted here, over seven hundred persons having already submitted themselves to the operation.—Rangoon, July 12th.

AN account is given in the *Indian Pioneer* of what promises to be an important discovery in connection with plague prevention. This is the fact that the crude oil left after the distillation of petroleum is a most valuable insecticide. Hitherto, the rat flea, now believed to be the ordinary channel of infection with plague bacillus, has defied the usual disinfectants, but according to Dr. Turner's report to the Bombay Corporation it succumbs at once to treatment with crude oil. Should Dr. Turner's results be borne out by further trials really effective disinfection of houses where plague has occurred will become possible.

NURSING IN INDIA.—The Up-country Nursing Association is to be absorbed in the Indian Nursing Association, which is being organised to provide skilled nurses throughout Northern India by the Countess of Mayo, wife of the Viceroy. The scope of the amalgamated Association will furnish nurses for the United Provinces, the Punjab, Rajputana, the North West Frontier Province, Baluchistan, Central India, Eastern Bengal, Assam and Burma.

THE annual dinner of the Indian Medical Service was held on June 29th in the United Service Club, Surgeon-General Bomford presiding. There were also present: Colonel Bate; Lieut.-Colonels Bamber, Leslie and Dawson; Majors Macnamara, Gee, Macnab, Browning Smith, Seton, Heard, Birdwood, and Sutherland; Captains Cochrane, Ainsworth, Cornwall, Baird, Greig, Barron, Trafford, H. Ross, J. H. Murray, Harvey and MacGilchrist, and Lieutenant Proctor.

AN accusation of adulteration has been brought by the Hyderabad Government against its opium contractors, which is creating great local interest. Gum, black sand, and the husks of *sangizira* are, it is stated, used to increase the bulk and weight of the opium as retailed. The case has been adjourned to admit of expert analysis of the opium seized in Madras.

THE Chief Court of Rangoon has been transferred to another building for a week, on account of dead rats, which were found to be infected with plague, being discovered in the record rooms.

HYDROPHOBIA IN ASSAM.—Recently, there have been several cases of hydrophobia in Assam from dog and jackal bites. The Indian Tea Association of that province have accordingly asked the local Government to issue orders for the prompt destruction of mangy and ownerless dogs, and to consider whether the imposition of a dog tax would not help to rid the bazaars and bustis, which are now swarming with useless and dangerous animals. —*Pioneer Mail*, June 29th, 1906.

MALARIA.—A. Woldert, of Tyler, Texas, U.S.A., found, except in one instance, anopheles quadrimaculata in the houses in which autochthonous cases of malarial fever prevailed in Philadelphia and Texas. In cold, frosty weather the male anopheles increased in numbers, but the females gradually disappeared.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

Cholera.—The outbreak of cholera in the Philippines is subsiding. The use of the vaccine prepared at the Government laboratory is giving excellent results.

Malaria.—The U.S. cruiser *Columbia* had 165 out of 300 marines on board infected by malaria contracted at Panama when she sailed recently for Boston via Porto Rico.

PLAGUE.

PREVALENCE OF THE DISEASE.

		Cases.	Deaths.
India.—Week ended	May 12th	13,207	11,414
	" 19th	13,061	11,783
	" 26th	8,684	7,660
	June 2nd	7,888	7,024
	" 9th	3,597	3,446
	" 16th	—	1,904
	" 23rd	—	952
	" 30th	—	769
Hong Kong.—Week ended	July 7th	—	536
	June 2nd	73	72
	" 9th	51	48
	" 16th	57	45
	" 23rd	34	31
	" 30th	21	18
	July 7th	12	7
	" 14th	14	17
	" 21st	7	5
	" 28th	5	6

Persia.—Plague continues in epidemic form in the Seistan District. The trade by the Nuski route with Eastern Persia is seriously threatened, owing to the prevalence of plague.

Australia.—In Brisbane up to June 16th the fresh cases of plague during the present outbreak, which commenced on March 10th, 1906, numbered 7, and the deaths from the disease 3. In Rockhampton, after an absence of six years, plague appeared on April 2nd, 1906; since then and up to July 7th, 1906, the fresh cases of the plague numbered 11.

Mauritius.—One case of plague reported during the week ended July 14th; the patient died. During the week ended July 26th 1 case of plague reported; the patient died. Since March 24th, 1906, Mauritius had been free from plague.

Personal Notes.

INDIAN MEDICAL SERVICES.

India Office: Arrivals of Indian Medical Officers in London.—Lieutenant-Colonel A. W. Alcock, C.I.E.; Major W. J. Buchanan.

Extensions of Leave.—Captain S. H. L. Abbott, Lieutenant-Colonel O. H. Channer, 6 m., Med. Cert.; Captain E. S. Parker, 6 m., Med. Cert.; Captain A. T. Pridham, 1 m., Med. Cert.; Lieutenant-Colonel J. Sykes, 8 d. furlough; Major T. W. Irvine, study leave, 1 m.; Major R. H. Castor, study leave, 6 w.; Major S. H. Henderson, study leave, 2½ m.; Major G. F. M. Ewens, from April 24th to June 30th, 1906; Captain F. A. Smith, study leave, February 15th to July 15th, 1906; Captain W. J. Wellock, study leave, March 1st to May 31st, 1906.

Permitted to Return to Duty.—Captain E. L. Perry, Captain W. Lapsley, Captain A. W. C. Young, Lieutenant-Colonel J. R. Adie, Lieutenant-Colonel J. Sykes, Lieutenant-Colonel J. J. Pratt, Colonel J. McCloghry.

Leave.

Honorary Captain M. Murphy, I.S.M., Civil Surgeon, Parlabgarh, privilege leave, 2 m.

Postings.

Captain T. G. N. Stokes, on special duty, Pachmarhi, to officiate as Civil Surgeon, Belaspur.

Captain J. G. P. Murray, to be 2nd Surgeon, Presidency General Hospital.

Lieutenant J. Catto, 16th Rajputs, to hold additional Civil Medical Charge of the Manipur State.

Colonel Wilkins, P.M.O., Burmah, is transferred in same capacity to Secunderabad.

LIST OF I.M.S. OFFICERS IN CIVIL EMPLOY AT PRESENT ON FURLOUGH.

Adie, Lieutenant-Colonel J. R., I.M.S., P. Med., 6 m., April 27th, 1906.
 Alcock, Lieutenant Colonel A. W., C.I.E., I.M.S., India Misc., 12 m., August 20th, 1906.
 Anderson, Captain S., I.M.S., B. Med., to September 25th, 1906.
 Anderson, Lieutenant-Colonel A. V., I.M.S., Bo. Med., 26 m. 3 d., September 10th, 1904.
 Baker, Lieutenant-Colonel R. J., I.M.S., Bo. Med., 6 m., August 16th, 1906.
 Barry, Major T. D. C., I.M.S., Bo. Med., 21 m. 5 d., September 4th, 1906.
 Braide, Major G. W. F., I.M.S., P. Goals, 4 m. 1 d., July 3rd, 1906.
 Browne, Captain F. D., M.B., I.M.S., C.P. Goals, 8 m. 9 d., May 6th, 1906.
 Browning, Lieutenant-Colonel W. B., I.M.S., M. Med., 4 m. 16 d., June 25th, 1906.
 Castor, Major R. H., I.M.S., Burma Med., 12 m., May 9th, 1906.
 Channer, Lieutenant-Colonel O. H., I.M.S., Bo. Med., 3 m. 6 w. 14 d., July 1st, 1906.
 Charles, Lieutenant-Colonel R. H., I.M.S., B. Med., 11 m. 16 d.
 Chaytor-White, Major J., I.M.S., U.P. Med., 3 m., June 30th, 1906.
 Clarkson, Major F. C., I.M.S., B. Comm., 17 m., June 16th, 1905.
 Coates, Lieutenant-Colonel W., I.M.S., P. Med., 5 m. 13 d., May 3rd, 1906.
 Collie, Lieutenant-Colonel M. A. T., I.M.S., Bo. Med., 3 m. 8 d., August 31st, 1906.
 Dalziel, Captain R. M., I.M.S., B. Goals, 6 m., May 12th, 1906.
 Deas, Captain L. J. M., I.M.S., B. Med., 4 m.
 Delany, Captain T. H., I.M.S., B. Med., 23 m. 9 d., April 9th, 1905.
 Donovan, Major C., I.M.S., M. Med., 12 m., March 8th, 1906.
 Drake-Brockman, Major H. E., I.M.S., B. Med., 18 m., May 5th, 1905.
 Duer, Major C., I.M.S., B. Med., 18 m., May 12, 1905.
 Evans, Captain S., I.M.S., Bo. Med., 11 m. 5 d., March 19th, 1906.

- Fayer, Captain F. D. S., I.M.S., M. Medl., 15 m., March 3rd, 1906.
- Fenton, Captain A., M.B., I.M.S., B. Goals, 15 m., August 29th, 1906.
- French-Mullen, Lieutenant-Colonel J., B. Med., 21 m., August 26th, 1906.
- Fullerton, Major T. W. A., I.M.S., U. P. Med., 12 m., February 18th, 1906.
- Gibbons, Lieutenant Colonel J. B., I.M.S., B. Med., 17 m., May 17th, 1906.
- Gibson, Dr. F. M., Bo. Med., uncovenanted service, 21 m., August 26th, 1906.
- Green, Major C. R. M., I.M.S., B. Med., 21 m., May 10th, 1906.
- Grein, Major C. R. M., I.M.S., B. Med., 21 m., May 10th, 1906.
- Haffkine, W. M., C.I.E., Bo. Misc., uncov., 27 m., July 30th, 1904.
- Henderson, Major S. H., I.M.S., U. P. Goals, 9 m. 14 d., January 18th, 1906.
- Hugo, Captain H., I.M.S., D.S.O., B. Med., 9 m., March 6th, 1906.
- Irvine, Major T. W., I.M.S., 13½ m., September 29th, 1905.
- James, Captain S. P., M.B., I.M.S., 9 m., February 22nd, 1906.
- Jameson, Major J. B., I.M.S., Bo. Medl., 21 m., September 15th, 1906.
- Kemp, Captain D. C., I.M.S., M. Med., 12 m., September 20th, 1905.
- Kenrick, Captain W. H., I.M.S., B. Medl., 10 m. 7 d., May 8th, 1906.
- Kilkelly, Major P. P., I.M.S., B. Med., 10 m., May 25th, 1906.
- Lamont, Major J. C., I.M.S., P. Med., 15 m. 11 d., April 1st, 1906.
- Leventon, Captain A., I.M.S., B. Medl., 18 m. 2 d., June 9th, 1906.
- Lincoln, Captain C. H. S., I.M.S., Bo. Med.
- Lindsay, Captain V. E. H., I.M.S., B. Med., 12 m., December 30th, 1905.
- Lloyd, Captain R. E., I.M.S., Indian Marine Survey.
- Lumsden, Major J. S. S., M.B., F.R.C.S., I.M.S., U. P. Med., 11 m. 26 d., January 6th, 1906.
- Lumsden, Major J. P., I.M.S., B. Med., 14 m. 13 d., September 10th, 1905.
- Maddox, Major R. H., B. Med., 15 m. 15 d., July 1st, 1906.
- Maitland, Lieutenant-Colonel I., I.M.S., M. Med., 18 m., March 30th, 1905.
- Melville, Major H. B., I.M.S., U. P. Med., 20 m., March 1st, 1906.
- Miller, Captain A., I.M.S., M. Med., 15 m., September 11th, 1905.
- Milne, Lieutenant-Colonel A., I.M.S., Bo. Mint., 4 m., July 28th, 1906.
- Monk, Lieutenant-Colonel C., I.M.S., Bo. Med.
- Morwood, Major J., I.M.S., U. P. Med., 20 m. 7 d., April 7th, 1905.
- Niblock, Captain W. J., I.M.S., M. Med., 12 m., March 1st, 1906.
- Nott, Major A. H., I.M.S., B. Med., 14 m., August 18th, 1906.
- Orr, Major W. H., I.M.S., U. P. Med., 15 m. 4 d., December 3rd, 1905.
- Pank, Lieutenant-Colonel P. D., I.M.S., B. Med., 5 m. 13 d., May 25th, 1906.
- Perry, Captain E. L., I.M.S., P. Med., 13 m., August 15th, 1905.
- Pilgrim, Major H. W., I.M.S., B. Med., 6 m. 1 d., June 15th, 1906.
- Powell, Captain A., I.M.S., Bo.
- Poynder, Lieutenant-Colonel J. L., I.M.S., B. Med., 3 m. 9 d., July 18th, 1906.
- Prain, Lieutenant-Colonel D., I.M.S., 19 m., February 1st, 1905.
- Pratt, Lieutenant-Colonel J. J., I.M.S., U. P. Med., 3 m. 12 d., July 14th, 1906.
- Rainier, Captain N. R. J., I.M.S., C. P. Med., 11 m. 23 d., November 19th, 1905.
- Rait, Captain T. W. F., I.M.S., B. Med., 19 m., March 21st, 1906.
- Rundle, Lieutenant-Colonel C. S., I.M.S., Burma Med., 21 m. 7 d., July 28th, 1905.
- Scotland, Major D. W., I.M.S., U. P. Med., 21 m., June 26th, 1905.
- Shore, Lieutenant-Colonel R., M.D., I.M.S., B. Med., 15 m., February 1st, 1906.
- Smith, Captain F. A., I.M.S., B. Med., 15 m., February 15th, 1906.
- Smith, Major G. McL. C., I.M.S., P. Med., 16 m., June 29th, 1906.
- Smith, Major H. A., I.M.S., U. P. Med., 15 m. 4 d., July 23rd, 1905.
- Smith, Major J. B., I.M.S., Bo. Med., 15 m., August 5th, 1906.
- Street, Major A., I.M.S., Bo. Med., 9 m., January 15th, 1906.
- Sutherland, Major W. D., I.M.S., C. P. Medl., 15 m., August 15th, 1906.
- Swaine, Lieutenant-Colonel C. L., C. P. Med., 18 m. 6 d., January 17th, 1906.
- Sykes, Lieutenant Colonel J., I.M.S., U. P. Med., 3 m. 14 d., June 21st, 1906.
- Symons, Captain T. H., I.M.S., M. Med., 14 m. 22 d., August 21st, 1905.
- Turner, Major R. G., I.M.S., U. P. Med., 9 m., June 27th, 1906.
- Wilkinson, Major E., I.M.S., P. Comm., 21 m., July 5th, 1905.
- Wilson, Captain R. P., I.M.S., B. Med., 5 m. 19 d., July 2nd, 1906.
- Wood, Major H. S., I.M.S., B. Med., 21 m., March 20th, 1905.
- Young, Major W., I.M.S., U. P. Med., 21 m. 21 d., January 19th, 1906.

NOTICE.

HENRY D. McCULLOCH, M.B., C.M., late Chief Medical Officer Hyderabad State Railways Hospitals, Deccan, after serving twenty-one years in India, qualified further at the Liverpool School of Tropical Medicine, and has during the last two years settled in practice at "Bassendean," Bournemouth, England.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Journ. Amer. Med. Assoc." January 2, 1906.

TAPE-WORM TREATMENT.

Ritter, John, in an article entitled "Some Parasites Infesting the Human Intestine," states that it is not necessary to fast before and after the administration of a téniafuge for tapeworm. He advises a calomel and colocynth capsule or pill with cascara and jalap added after dinner, and on the following morning, when the bowels have been well emptied, the following emulsion:—

R.	Resina podophyllini	...	...	...	gr. i
	Oleoresini filicis maris	...	...	...	ʒiiss
	Extracti fluidi kamala	...	...	...	ʒiii
	Spiritus chloroformi	...	...	...	ʒi
	Mucilago acacie	...	...	...	ʒi
	Aque menthae piperitæ q. s. ad	...	...	...	ʒiii

M. Ft. emulsio. Sig.: Take in three equal doses at intervals of half an hour.

The same drugs may be given in capsules, the extract of kamala being evaporated previously to the consistence of syrup, and the oleoresin of male fern being added slightly warm.

"Therapie der Gegenwurt," Berlin, vol. xvi., No. 12.

COOKED STARCH IN DIARRHŒA.

Hauffe, G., recommends cooked starch sipped in teaspoonfuls from time to time in diarrhœa of any kind. He finds it especially beneficial in the tubercular variety. As a gargle in sore throat it is particularly soothing.

"Hygien Rundschau," T. xvi., p. 405.

CULTURE MEDIA FOR CHOLERA VIBRIOS.

Doebert and Johannissian tested the efficiency of Hirschbruch and Schwer's medium, which is composed of gelose and Liebig's extract, to which is added some crystals of violet and heliotrope with the view of distinguishing choleraic from *B. coli* colonies; but find that the growth is greatly retarded. In both the above medium and Koch's, the colonies are fewer and smaller, and this method, therefore, fails to come up to the expectations promised for it.

"Journal of Infect. Diseases," T. III., p. 394.

THE TRYPANOSOMES OF TSETSE-FLIES.

Novy, Fred. G., endorses the views of Minchin and his colleagues to the effect that the flagellates found by Gray and Tulloch in the intestinal canal of *Glossina palpalis* have no connection with *Tryp. gambiense*. Novy had also some preparations of the intestinal contents sent him from Uganda, by Gray, and considers that the forms described by Koch as evolutionary stages of *Tryp. gambiense* and *Brucci* are entirely different from these flagellates, for the following reasons:—

- (1) The Tsetse forms are much longer than the blood parasites.
- (2) Their presence in flies that had no opportunity of biting infected animals, as *e.g.*, in the Tsetses of the island of Kimm, already instanced by Minchin.
- (3) The failure to obtain evolutionary forms from Trypanosomes ingested by flies fed on infected animals.
- (4) The impossibility of systematically infecting animals with the flagellates of these Tsetses.
- (5) The analogy of the Trypanosomes of Mosquitoes.

Novy then proceeds to describe the various forms met with, the great variety of which tends to the conclusion that they belong to several distinct species. He proposes the name *Trypanosoma Grayi* for the numerous forms in one of these flies. These extremely varied forms belong to two types: one very long and thin with a long free lash, bacilli-form nucleus, and large centrosome in front of the nucleus; and the other thicker and shorter, with rounded nucleus and centrosome close to it, well developed undulating membrane, and short free lash. He compares these two types with the male and female forms of Koch. It should be remembered that Minchin has seen similar forms in *C. palpalis* starting from the *T. gambiense* of the blood.

Preparations of other Tsetses yielded forms mostly differing from the above, and from each other, though evidently belonging to the same generic group, and Novy describes three more of them. Finally he states his conviction that the probably non-pathogenic flagellates found in insects correspond with the forms met with in artificial cultures.—(F. Mesnil.)

"Arch. Institut. Royal Bacter., Camara Pestana.

Bellencourt, A., and Trança, C., describes trypanosomes from the badger and rabbit, the latter of which proved infective to other rabbits, but not to mice, rats or guinea-pigs. They also describe a bat parasite from *Vespertilio kuhli*, of Tunis.

"Lancet," March 10, 1906.

ON THE ANIMAL REACTIONS OF THE SPIROCHÆTES OF AFRICAN TICK FEVER.

Breuil and Kinghorn.—In this preliminary note the authors demonstrate the marked pathogenicity of the spirillum

brought by Todd from the Congo Free State. Their investigations were started from a monkey infected by ticks, and which died with large numbers of parasites in its blood. Peritoneal injections, usually of large doses, were always adopted. Rats were usually infected in a few hours, though in exceptional cases the stage of incubation may extend to twenty-one days, and they died in from one to forty-five days. Sometimes the animal died in the first paroxysm, and in others they survived three or four days before succumbing. The principal *post mortem* signs were hypertrophy of the spleen and numerous hæmorrhagic infarcts. Mice died in from twenty-four to forty-eight hours, with enlarged spleens. Rabbits showed spirochætes in the blood after two to three hours, their number increasing and persisting for three days, the animal dying in three to ten days. The temperature ranged from 38° to 40° during the first hour, and then remained at 40·5° to 41·5° till death. Marked changes in the spleen, liver and bone marrow. Of four guinea-pigs two died on the third day, the others were infected for forty-eight hours and then recovered. A dog and a pony showed signs of infection for three days and then recovered. A monkey, subcutaneously inoculated, showed parasites in the blood. The infection of monkeys by tick bites took place after five days' incubation, and those that succumbed showed lesions of the spleen, liver and bone marrow in the shape of anæmic infarcts and necrotic areas. They conclude that the spirochæte of tick fever differs from *S. Obermeiri*.

"Att. de la Societ  per gli Studi de Malaria," 1906, pp. 125-132.

THE PRESENCE OF H MOLYTIC BODIES IN THE BLOOD IN HUMAN MALARIA.

Dr. Dante de Blasi confirms the previous researches of Celli, Casagrandi and Carducci in their results on the non-existence of any autolytic or isolytic properties in the blood of malaria patients. His experiments were made with an aqueous extract of malarial blood. 1 cc. of blood clot is emulsified with 19 cc. of sterilised distilled water, yielding a liquid which has itself a distinct rosy tint, so that in estimating his results the experimenter must gauge the degree of hæmolysis by comparisons with type dilutions of "laked" blood. He finds that both (1) the extract of malarial blood and of non-malarial, are alike isolytic, but the former is more so than the latter. (2) The extract of malarial blood is alone autolytic. Autoh molysis is, however, merely frequent but not constant, and may be present in all types of malarial fever. Moreover, it is not due to the taking of quinine, as one of the cases described had taken none. Further, the author found no autoh molytic power in the blood of persons whom he had given a gramme of quinine daily for eight days hypodermically. The phenomenon, however, cannot be referable to the malarial parasite itself, as it was demonstrated in the blood of two convalescents. By centrifuging the watery extract the author separated a deposit of leucocytes and stroma of red corpuscles, that was even more hæmolytic than the liquid itself. This property of the blood-extract resists heating to 56° for half an hour, but is destroyed by 60° at the end of an hour, and by 100° in half an hour, and cannot be restored by the addition of fresh serum. The resisting power of the red corpuscles has nothing to do with malarial hæmolysis as the author, having found that a physiological solution is hæmolytic if kept for sixteen to twenty hours in contact with a well-washed clot, demonstrated that this solution was almost as effective as the red corpuscles whether malarial or non-malarial; while in using the watery extract the malarial corpuscles are much more active than the non-malarial. Intracellular hæmolysine is not specific, as he found it also in cases of typhoid, rubeola, erysipelas and scarlatina, but in a case of ancylostomiasis the watery extract was neither auto- nor iso-lytic, while the serum possessed both powers.

Lastly, the serum of malaria and of non-malaria patients inhibits the autoh molysis produced by the watery extracts of malarial blood.

"C. R. Soc. Biologie," T. lix., p. 19.

THE PATHOGENY OF BILIOUS HÆMOGLOBINURIC FEVER, AND ITS TREATMENT BY CHLORIDE OF CALCIUM.

Vincent, H.—According to the writer this form of fever appears in malarial cases under the influence of various secondary influences, one of the commonest of which is the absorption of quinine. This drug will sometimes give rise to hæmoglobinuria even in non-malarial cases.

When due to quinine it is easy to avert the crisis by giving four to six grammes of chloride of calcium daily by the mouth, or one to two grains hypodermically, dissolved in physiological solution. The drug here acts as an anti-hæmolytic, much as it does in the coagulation of blood, or, as Delezenne has recently demonstrated, in the action of pancreatic juice. M. Laveran, however, regards the connection of quinine with blackwater fever with some reserve, as the disease is unknown in many malarious regions, and, moreover, often appears in cases that have not taken quinine.

"Semaine Médicale," April 11, 1906.

TROPICAL HYGIENE IN BRITISH, GERMAN, AND FRENCH COLONIES.

Glauguen, surgeon in the French Navy, has published notes he made whilst cruising along the eastern coast of Africa. He was surprised to find that the British are behind the Germans in the matter of making and keeping their possessions healthy. The English fall back on their egotism and individual hygiene; the Germans on their inflexible militarism, and the French on their proverbial heedlessness.

English prophylaxis is based on two things: entire separation of the native and the European communities, and strict application of the principles of private hygiene. The English lead an active life, with athletics, &c., to keep mind and body in a healthy condition; they reside in comfortable houses, but they make no effort to render the country healthier, and improve the sanitary conditions of the natives. There is no attempt at a general plan of campaign against tropical diseases. The native quarters are left in their filth, and fall an easy prey to disease. Plague is installed in nearly all the British colonies on the Indian ocean, and with a few exceptions, no satisfactory measures have been taken even against malaria.

The Germans, on the other hand, enforce the same sanitary measures in the native as in the European quarters. Hospitals are being organised at the main points, and the country is divided into districts, each in charge of an agent empowered to enforce the sanitary regulations. Medical stations are organised along the caravan routes, and the natives are examined, registered, and given certificates. Laboratories are numerous. The streets in the native quarters have been made wide and airy, and are kept clean. The garbage is carted away daily, instead of being allowed to accumulate around the houses, as in the English and other colonies. Standing waters are drained or oiled. Quinine prophylaxis has been introduced by the Germans on an extensive scale. Wherever he went in the French colonies he constantly heard the complaint: "If only this country belonged to England, it would have been made healthy long ago." The French are now trying to introduce some semblance of the German measures into their colonies, and with some success.

"Lancet," August 4, 1906.

(1) "A Note on the Treatment of Catarrhal and Gangrenous Dysentery."

Amos, C. B. Sheldon, M.B., writing from the Hospital at El Tor, Sinai, describes his experiences during four seasons of observation. He states that (1) for slight and recent form of dysentery supervening on diarrhœa, he finds good results from sodium sulphate in drachm doses, given hourly until a faecal stool is passed. The treatment is repeated on successive days until tenesmus is no longer complained of, and neither blood nor mucus is passed. (2) in the gangrenous form of dysentery ipecacuanha given in the usual way

(30 to 60 grains ipecacuanha, half an hour after exhibiting 20 drops laudanum), is applicable and efficient in young and robust men suddenly seized with dysentery. In old and feeble patients, calomel in $4\frac{1}{2}$ grains thrice daily, a treatment previously advocated, is productive of harm; calomel in minute doses of $\frac{1}{4}$ grain, in three successive doses, is less objectionable; but calomel in any form is pernicious in dysentery. (3) Opium, by giving complete rest, is advocated by Dr. Amos in enthusiastic terms, especially in old chronic cases. Morphine, administered hypodermically, every four hours or every eight hours, as expedient, combined with sparteine or caffeine injections to combat cardiac exhaustion, is the form of administration advocated.

Rectal injections have been occasionally useful, according to Dr. Amos; sulphate of copper, 1 in 1,000, being perhaps the best, but rectal injections, when the intestine is gangrenous, are not without danger.

As regards diet, Dr. Amos states that Africans, Turks, and all Asiatics almost invariably evince a great repugnance to milk. When they can be persuaded to take it the régime followed is as follows: They receive half a pint of milk at 7 a.m., when those without hæmorrhage also have a small piece of bread; at 11 a.m. a plate of finely mashed rice, potatoes, lentils, macaroni, or beans, over which a little meat soup has been poured, is served round. Convalescents also have a small piece of bread. At 5.30 p.m. they have a similar meal. During the night they have a pint of milk diluted with water to the patient's liking. Those who are very weak have in addition each day the whites of four eggs beaten up with brandy or water. The yolks of eggs they cannot digest. No pure water is given, but a 1 in 3000 solution of lactic acid is placed at the bedside for them to sip at will. With this dietary blackened tongues become moist and clean in one or two days, thirst disappears, no undigested food appears in the stools, and no difficulty is found in inducing the patients to take nourishment.

(2) "A New Subspecies of *Glossina palpalis* on the Upper Congo."

Massey, A. Yale, writing from Ruwe, Congo Free State, states that at the junction of the Lufupa and the Lualaba, 10° S. lat., specimens of the subspecies *Glossina palpalis wellmani* have been found. Isolated cases of sleeping sickness have been found in the locality, but it is unknown where the patients contracted the disease.

(3) "A Case of Plague with Unusual Eye Symptoms."

Rees, Phillip, M.B. Lond., at the Fatshan Hospital, near Canton, China, has recently observed some unusual signs and symptoms of plague. In one case the submaxillary region was swollen and infiltrated to an inordinate extent; in other cases no glandular enlargement could be detected; a blood-stained discharge from the nose is recorded in one or two fatal cases. A female patient, with enlarged glands in arm and groin, and in whom abortion occurred on the sixth day of the illness, developed conjunctival hyperæmia, the pupil of the left eye became occluded with lymph, and there was slight hypopyon. In the right eye there were three patches of lymph on the posterior surface of the cornea. Atropine instillation gradually dilated the pupil, the woman, however, refused further treatment, and died whilst under the care of a native doctor.

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

THE BACILLUS OF HAMILTON WRIGHT,
OBTAINED FROM TWO CASES OF ACUTE
BERI-BERI.

By LEONARD S. DUDGEON, M.R.C.P.Lond.

*Bacteriologist to St. Thomas's Hospital; Lecturer on Pathology in the Medical School, and Director of the Hospital Laboratories.
(From the Pathological Department, St. Thomas's Hospital).*

A SHORT account will be given here of the bacillus which Dr. Hamilton Wright isolated from the duodenum and from the fæces in two acute cases of beri-beri, and which he sent to me for investigation. It will be most convenient to refer firstly to the morphological and cultural characters of the above mentioned organism, and then to refer to the experiments which were made as to the pathogenicity of this bacillus.

MORPHOLOGICAL CHARACTERS OF THE BACILLUS
ISOLATED FROM THE DUODENUM.

This organism varied from 0.5 to 5 μ . in length, some very long forms occurring in chains were also met with; no constant or typical arrangement was observed. It was Gram positive and stained well with basic Fuchsin and Loeffler's methylene blue. The organism did not take the stain with the same intensity throughout, some portions being much paler than others.

MORPHOLOGICAL CHARACTERS OF THE BACILLUS
ISOLATED FROM THE FÆCES.

This bacillus showed no tendency to form chains, was a stouter bacillus, often found in clumps, the staining was more irregular, with a tendency to darkening at the poles, while a few of the bacilli showed definite club-shaped ends; in other respects this bacillus resembled that isolated from the duodenum.

CULTURAL CHARACTERS.

It may be stated at the outset that the organism which Dr. Hamilton Wright has isolated from these cases of beri-beri, was an obligatory anærobie. It was found to be a matter of considerable difficulty to cultivate this organism in liquid media, even under anærobic conditions. Most satisfactory results were obtained by growing it in the depths of solid media.

It will be most convenient if the cultural characters of the bacillus isolated from the duodenum and from the fæces are given in a tabulated form under the respective headings. The points of resemblance will then be very readily seen. In all instances, except shake cultures, the organism was grown at 37° C., either in Buchner's tubes or Bulloch's anærobic jars.

DUODENUM.	FÆCES.
<i>Agar slopes.</i> —Delicate and slightly opaque colonies appeared in twenty-four hours; they only slightly increased in size as time advanced. The full sized colonies were about the same diameter as those of a virulent streptococcus.	Ditto

DUODENUM.	FÆCES.
<i>Litmus milk.</i> —No change in fourteen days.	Ditto
<i>Glucose gelatine shake.</i> —(22° C.). Small opaque white colonies occurred in the depth of the medium in twenty-four hours; as time advanced, the colonies slightly increased in size, were opaque and showed no tendency to produce liquefaction of the medium, even at the end of several weeks. The growth was very much more abundant in the depth of the medium than at the surface. In many instances a typical stalactite arrangement was noticed. No gas formation occurred.	Ditto
<i>Glucose gelatine slabs.</i> —(22° C.). A delicate growth occurred along the course of the needle and gradually became more marked as time advanced. At the end of a month the colonies were thick, opaque, white and much larger sized towards the depth of the jelly than towards the surface.	Ditto
<i>Glucose agar slabs.</i> —(37° C.). Similar results to the glucose gelatine slabs.	Ditto
<i>Neutral red broth.</i> —No alteration in colour at the end of one month's incubation.	Ditto
<i>Drigalski and Conradi's medium.</i> —Stab cultivations were made, but no alteration in the colour of the medium occurred after one month's incubation at 37° C., and no definite colonies were detected.	Ditto
<i>Litmus maltose shake.</i> —Acid, but no gas at the end of seven days' incubation.	Acid, but no gas at the end of seven days' incubation.
<i>Litmus lactose shake.</i> —Acid, but no gas at the end of seven days' incubation.	No change.
<i>Litmus raffinose shake.</i> —No change.	No change.
<i>Litmus mannite shake.</i> —No change.	No change.
<i>Litmus cane sugar.</i> —Acid, but no gas in seven days' incubation.	Ditto

PATHOGENICITY.

Saline emulsions were made from a forty-eight hours' culture on agar of the bacillus from the duodenum and also from the fæces.

Experiment A.—Two cc. of each culture were injected into the peritoneal cavity of two guinea-pigs, but neither animal was in the least way affected, and when killed at the expiration of one month, appeared to be perfectly healthy. The heart muscle was stained with Scharlach R, but failed to show the slightest evidence of any fatty change.

Experiments B and C.—Two cc. of saline emulsions from gelatine cultures were injected into the peritoneal cavity of mice and subcutaneously into guinea-pigs, but in no instance was any effect produced.

Experiment D.—A guinea-pig was fed on 2 cc. of a saline emulsion of the bacillus isolated from the duodenum, but at the end of one month the animal was apparently well.

AGGLUTINATION TESTS.

Owing to the courtesy of Dr. Stanton, of the

Seamen's Hospital, I obtained the blood from three cases of beri-beri. A forty-eight hours' culture of the bacillus isolated from the duodenum was used for the agglutination reactions.

	Period of Disease	Result
Native of Bombay	Early stage ..	Dilation 1'20, no reaction
Norwegian sailor...	6th month ..	" "
Native of Calcutta	Six weeks. (Several cardiac attacks during the past few weeks.)	" "

CONCLUSIONS.

(1) From the investigations which I have made it seems probable that the bacillus isolated from the duodenum and that isolated from the faeces are one and the same organism. The only points of difference are slight variations in their morphology, and that one of them acidifies lactose, the other not.

(2) There was nothing in this investigation to show that the organism of Hamilton Wright is related to beri-beri. It has been found to be non-pathogenic to mice and guinea-pigs, and the serum obtained from three cases of beri-beri during various stages of disease, failed to produce any agglutinative reaction on this bacillus.

Of course, one must be fully alive to the fact that, although this bacillus is non-pathogenic to mice and guinea-pigs, and did not agglutinate when tested with the serum of three cases of beri-beri, it may, yet, be the cause of the disease, but this seems to me improbable.

BERI-BERI; MOULDY RICE: THE OCCURRENCE OF BERI-BERI IN THE SOKOR DISTRICT.

By JOHN D. GIMLETTE, M.R.C.S.Eng., L.R.C.P.Lond.

THE inference that beri-beri, as it occurs in British Malaya, is due to mouldy rice was taken some years ago as the basis of an argument by Mr. Leonard Braddon, F.R.C.S., State Surgeon of Negri Sembilan, in the Federated Malay States [1]. It excited a good deal of local discussion at the time, and the mouldy rice theory was again lately revived by Dr. S. Lucy, Colonial Surgeon, Penang [2], and still more recently urged by Charles Hose, Esq., D.Sc., Divisional Resident of Sarawak, in North Borneo [3].

It is a theory, and there are many who are not satisfied with the circumstantial evidence which has been brought forward to support it, while there are others, notably, Dr. E. A. O. Travers, State Surgeon of Selangor, who have decidedly disagreed with Mr. Braddon's original contention that the probable cause of beri-beri is a toxin conveyed in certain forms of rice [4].¹

¹ Many others who have spent years in exhaustive research work on Beri-beri have entirely rejected the rice theory. The cause of beri-beri, however, has not yet been definitely proved by them to Science, and for this reason I think that any new evidence which appears to support the rice theory is worthy of their attention.

The following notes were taken in the interior of Kelantan, a distant State in the Malay Peninsula, about 350 miles north of Singapore. Three years ago mining operations were commenced in Kelantan by a British Syndicate which was soon formed into a large Company, to which I was appointed the first resident medical adviser. The native state of Kelantan had not hitherto been explored by any European miners. It was therefore a typically new country, with new mines, and, beri-beri being such a well-known local scourge among Chinese, some anxiety was felt in the early days of the Company as to the health of the newly imported gangs of coolies that were necessary to carry on the work of underground mining.

Chinese labour is universally employed for this purpose in the Malay Peninsula, but, curiously enough, this mining district in Kelantan (afterwards referred to as the Sokor district), remained at first remarkably free from beri-beri. No cases were diagnosed in 1903.

Mining operations were commenced in the interior of Kelantan, in a valley some seven miles distant from a small station on the river Sokor; the general welfare of the Company's coolies was quite as well, if not better, cared for as compared to that in similar mining districts; the meteorological conditions—all very favourable to the formation of moulds—were found to be more or less the same as those in other parts of the Malay Peninsula; the coolies were fed upon imported Rangoon rice, as is customary in other mining camps in this part of the world.

Rangoon rice is more liable to be attacked by moulds and weevils than any other kinds of imported rice [3]; it is also more difficult to clean for cooking, as it soon becomes broken in the necessary process of kneading and washing, but it is cheap and is in common use. The supply was mainly obtained by the Company from Singapore, because the conservative Chinese do not care to purchase rice which is grown locally and only roughly husked by indolent Malays for retail; moreover, the Company had endeavoured to store Kelantan rice, but found that this was impracticable, as it very quickly deteriorated after it had been husked by hand and stored.

As there was no market in the Sokor district it was necessary to stock a comparatively large amount of rice for the Chinese miners; this was all kept, at first, in a small store at the river station in bags, each of which generally contained from 1 to 1½ pikuls of rice. The pikul is a Malay measure of weight in everyday use; it is approximately equal to 133½ lbs. avoirdupois, and is divided into 100 catties, each catty roughly corresponding to 1½ lbs. avoirdupois.

WHY RICE DETERIORATES.

These large bags were all piled in a small space, one on top of another to a height, and being fairly heavy were difficult to interchange. When a large supply of rice came in, the new bags were invariably placed on the top of the old pile. This was unfortunate, as was afterwards proved, because, long before the delivery of the rice on the bank of the river Sokor it was exposed, as rice in the husk, to deterioration through damp. The writer of an article on "A Trip to Burma," recently published in the local press, says, when describing the railway journey from Ran-

goon to Mandalay: "A resident of the country told us that the paddy owners often had to wait a month before the railway could take their grain. We saw stacks and stacks of it—in bags—lying out in the open alongside the line near railway stations" [5]. The rice is shipped from Rangoon to Penang, and from there to Singapore.

Dr. Lucy also mentions that when large consignments of this rice to the Straits Settlements coincide with an interval between the crops in Rangoon, the only supply at these times is of an inferior quality left over from the last crop. Such an interval occurs in October. As regards Kelantan, delays occur in shipping from Singapore, as well as delays and boating accidents on the Kelantan rivers, especially during the violent weather of the North East monsoon season, which is mostly felt during the months of November, December and January.

Local means of communication with the Sokor district, again, are very slow; under ordinary circumstances six or seven days are taken in transporting cargo by river boats to the headquarters of the Company, located about fifty miles inland from the coast; from there it has to be transhipped into much smaller boats for transport up the river Sokor, which is a small stream in the adjoining Sokor district. Another four days would be taken before it was finally distributed in the mining camp, making a fortnight from Singapore even in good weather.

Some idea of the bad weather during the North East monsoon season may be gathered from the records of rainfall in Kelantan. The rainfall in the Sokor district was 27.99 inches in December, 1904; 17.42 inches for the month of November, 1905; 10.97 inches in December, 1905, and 28.48 inches for January, 1906.

Mining coolies or their contractors obtained rice, from time to time, in small quantities by means of an order in writing on the clerk in charge of the river store and carried it through the jungle to the mine. There was a tendency on the part of the contractors to apply for large quantities of rice at the beginning of the month, but it could not always be delivered to them then, on account of occasional difficulties with the jungle transport. Their applications varied according to circumstances, and their only means of supply was through the river store. The main rivers in Kelantan may rise to a height above 30 feet during the wet weather, and there are then corresponding floods in the smaller streams, such as the Sokor river and other small rivers in the district. Good judgment was therefore essential in order to keep a fair balance between the supply and demand for rice at the river store. The native clerk in charge of the store was an intelligent Sumatran who was appointed in 1903.

PREVALENCE OF BERI-BERI.

Little concern was felt as regards beri-beri during the greater part of 1904, although the number of Chinese workmen was greatly increased. There were, for instance, only eight cases of this disease registered, with two deaths, a mortality which was trifling when compared to an appalling death-rate of 79.99 per cent. (187 deaths out of 234 cases), as I had known it

in one of the mining districts of a neighbouring State [6].

Towards the close of the year, however, the general health of the Sokor district was far from satisfactory, malaria was very prevalent in the mining camp, which had always been topographically unfavourable to health. Special attention was accordingly paid to sanitation, and some expense as well as much trouble was incurred in trying to render the camp more healthy, but it was, nevertheless, unsatisfactory to report, at the end of June, 1905, that a number of cases of beri-beri had occurred. There had been 37 cases with 7 deaths.

The coolie gangs had been increased by about 100 men as compared to 1904, bringing the whole strength up to 400 Chinese. Among them were a number of inexperienced new comers from Singapore, who had been engaged by a Chinese contractor in May under conditions similar to those of the "Singkheh" or indentured Chinese labourer of the Straits Settlements.

The bad health of the "one year contract Singkheh" is notorious in the Malay Native States, and these new arrivals in Kelantan suffered, as might have been expected, considerably more than older "Lowkhehs" or time expired Singkhehs would have done. Twelve of them died from various causes in a very short time, six of them from beri-beri in July.

Many of these untrained Chinese were lodged in some newly-erected coolie lines, and it was thought at the time that they were being affected by reason of a somewhat extensive disturbance of the soil which was found necessary when erecting their buildings. As beri-beri has been thought by some to have an indefinite connection with disturbance of the soil in the Tropics [7], stress was laid on this fact; greater attention was paid to sanitation; old buildings were destroyed; the ventilation and hygiene of the camp generally improved, and overcrowding prevented as far as possible.

TABLE A.
SHOWING THE INCIDENCE OF THE DISEASE IN 1905.

Months	New Cases	Deaths	Nationality			Treated in Hospital	Treated as Out-patients
			Chinese	Javanese	Malays		
January ..	6	5	2	4	..	5	1
February ..	..	1	..	..	..	..	..
March ..	2	..	2	..	..	..	2
April ..	1	..	1	..	..	..	1
May ..	10	1	9	1	..	4	6
June ..	18	..	17	1	..	7	11
July ..	28	6	28	..	..	8	20
August ..	10	1	10	..	..	..	10
September ..	4	..	4	..	..	..	4
October ..	5	..	5	..	..	..	5
November ..	9	2	9	..	..	1	8
December ..	12	1	7	..	5	1	11
Total ..	105	17	94	6	5	26	79

The principles of sanitation in the Tropics were now very strictly enforced, and at the end of the year a great diminution in the prevalence of malaria was the result, but it was vexatious to find that there had been 68 additional cases of beri-beri with ten more deaths from this disease. The incidence of the outbreak is shown in the attached table A.

With regard to this table it is important to note that the total strength of the mining coolies was reduced by more than one half during the last five months of the year. The reduction began in August, and by the end of the year there were only about 100 Chinese miners left at the works. Under the heading "new cases" only different individuals are included; the death which occurred in February was a case which had remained over from January. It is only of passing interest to notice that, as regards seasonal prevalence, by far the greater number of cases occurred during the months of the south-west monsoon, namely, from April to September inclusive. The greater number of coolies were employed during these months. The influence of the north-east monsoon on the supply of rice will be seen later.

TABLE B.
SHOWING THE CLINICAL FEATURES OF THE FATAL CASES
IN 1905.

Date, 1905	Nationality	Subjective Symptoms	Died, 1905
Jan. 1	Javanese ..	Slight previous fever, weakness, orthopnoea, sudden cardiac pain and vomiting	Jan. 14
" 1	Javanese ..	Admitted for ulcer of leg, swelling of legs and body followed, died suddenly	Feb. 20
" 13	Ch. Kheh..	Debility, shortness of breath, swelling of legs and face	Jan. 14
" 14	Ch. Kheh..	Sudden severe cardiac with hepatic pain and orthopnoea	" 14
" 18	Javanese ..	Previous fever, weakness, swelling of whole body and extremities, sudden cardiac pain	" 29
" 31	Javanese ..	Anæmia, debility, dyspnoea, tenderness of legs, with sudden cardiac and hepatic pain	" 31
June 28	Ch. Kheh..	Previous fever, numbness and tenderness of legs, with general oedema	July 8
July 1	Ch. Hailam	The same as above	" 7
" 2	Ch. Hailam	The same as above	" 15
" 5	Ch. Kheh..	The same as above, with hepatic pain	" 9
" 10	Ch. Hailam	The same as above	Aug. 14
" 24	Ch. Kheh..	Second attack, great cardiac pain and dyspnoea, died suddenly	July 24
Nov. 2	Ch. Kheh..	Previous fever, swelling of whole body and dyspnoea	Nov. 9
" 24	Ch. Hailam	The same as above, with greater swelling	" 24

The date in the table above refers to the day on which the patient first applied for relief.

The incidence of the outbreak was characterised as follows: in January it occurred in the acutest form of the disease, all the cases died. In the second week there were three sudden deaths within twenty-four

hours. The outbreak was mainly confined to the Javanese who were employed as timber cutters, 33 in number, and was so unexpected as to arouse the private suspicion that the patients had been poisoned by their contractor for the purpose of gain. The cause of their deaths, however, was investigated, and all the cases were registered as due to acute beri-beri.

In May an equal number of cases occurred in each half of the month; the same happened in June, but in July, when the disease was at its height, 18 cases out of the total occurred in the first half of the month. The total Chinese strength was then also at its maximum. In August, 8 cases occurred in the first half of the month, and in November again 5 in the first half of the month. In December, it attacked the Malays for the first time and was seriously affecting the Chinese; of the total number treated 9 applied again for relief during the first half of the month. The death rate for beri-beri in 1905 was 16.19 per cent. for cases treated, the greatest mortality occurring in January, July and November. In every instance the disease was of the so-called wet variety; the chief clinical features of the cases which were fatal during January, July and November are shown in table B.

ASSIGNED CAUSES OF BERI-BERI.

It was part of my duty to visit the Sokor district twice every quarter, and to leave a written report before returning to headquarters. The importance of improved sanitation as a check to beri-beri was frequently referred to in my reports, but the possibility of mouldy rice being a vital factor in connection with the disease was, unfortunately, overlooked until the last month of the year. In the second week of March, however, I examined the diets of the Javanese and reported that their rice was of good quality, but not sufficiently cooked. The Chinese themselves in the Sokor district do not regard mouldy rice as even a probable cause of beri-beri; on being questioned as to the cause they almost invariably refer to exposure to the very cold water in the underground workings or to the drinking of bad water.

The Sokor district hospital is in charge of a Chinese dresser (corresponding in rank to the Indian hospital assistant); this dresser was specially chosen in 1904, partly on account of his experience of beri-beri. He had formerly been in the F.M.S. Government Service under me, and was, at that time, stationed in the mining district, where the death rate from beri-beri was as high as 79.99 per cent. of cases treated.

Late in December he called my attention to the diet which was then in everyday use in the camp, and collected, on December 20th, samples of the rice which was being prepared for the meals in the coolie lines on that day. I examined and found that these samples were full of the live larvæ of a small light brown moth and that the grains of rice were clotted with excrementitious matter. The worst sample was one taken at the coolie lines occupied by some Chinese miners under contract to a Hailam named Ah Juan. This contained, in addition, a few small beetles, as well as the well-known rice weevil, *Calandra oryzae*, L.

At the coolie lines the Chinese cooks were trying to clean this rice by hand after drying it in the sun, and

then washing by kneading it, by means of their feet, in perforated empty kerosine tins. As soon as it was sufficiently clean to the naked eye it was cooked in the usual way, that is to say, it was put into a large iron cooking pan (a kwalli), containing boiling water, stirred and boiled until it was cooked and then finally allowed to steam under the cover for about half an hour, when it was ready to be eaten either hot or cold. Water for washing and cooking was obtained from a small stream running through the camp.

Three of the Chinese cooks employed contracted beri-beri, one in the month of May, one in August, and another in October, each after about two months' work in the coolie lines. These cooks were, as is characteristic of their race, mixing good rice with the bad in order to deceive the coolies. They cooked rice twice a day in accordance with the usual Chinese custom; it was their staple diet, meat being seldom eaten.

It is important to note here, that all the rice at the river store had, at the close of the year, been transferred to a new store house which had lately been built at the mine. The river store house, only 13 feet by 18 feet and about 10 feet in height, had become too small. The rice was transferred from there during the months of September, October, November and early in December, the fresh supply of rice for December being carried direct to the mine. As soon as the bad rice was discovered in December, an examination of all the rice in the new store was held, and it was reported that a large quantity of it was unfit for consumption. I saw that most of it was infested by the same kind of worms and insects mentioned above, but by careful winnowing more than half of it could be rendered, to all intents and purposes, similar in appearance to good rice. There were several bags also in which the rice was greenish, sour-smelling and distinctly mouldy; the sacking was caked inside with rice which had obviously decayed owing to exposure of the bags to water.

DETERIORATED RICE AN APPARENT FACTOR IN THE ETIOLOGY OF BERI-BERI.

It is now of interest to try and trace the connection, if any, between the occurrence of beri-beri in the Sokor district and the variation in quantity of fresh rice supplied from the local store, and I think it will be admitted that this particular outbreak appears to have been coincident with the use of deteriorated rice.

In the year 1904, all the eight cases of beri-beri occurred in the first two months of the year, one in January and the other seven in February; they were all Chinese, the one in January died suddenly and another almost suddenly in February. At this time the coolies, who were for the most part newly arrived Hailam miners, were working on the top of a high hill, which caused their local means of communication to be even a little more difficult than was usual. Five of the 8 cases occurred among the Hailam miners; they had all eaten deteriorated rice.

At the end of 1903, there were 119.24 pikuls of rice in the river store, much of which must have been at the bottom of the pile for some time, no fresh rice was received in January, 1904, but 60.58 pikuls were issued, leaving 58.66 of the original balance from

1903; in February, only 27 pikuls were received, and by the end of the month 73.96 pikuls had been issued. The greater part of the old rice was therefore used up in the month of February. The balance in hand at the end of the year 1904 was 104.06 pikuls of rice. With the exception of the month of February, when the amount of rice in store at the end of the month was only 12.40 pikuls, the balance of rice at the end of each month varied between about 30 and 90 pikuls throughout the year, but the amount was slightly greater during the last two months, when provision was being made for the north-east monsoon season. There was never a great surplus of rice in stock in 1904.

The Sumatran clerk in charge of the store told me that he always, so far as possible, endeavoured to interchange the bags, and this would have been feasible provided the supply of fresh rice was moderate in amount.

It was impossible to attempt to trace the local issues of the bags originally imported from Singapore, because the larger bags containing $1\frac{1}{2}$ pikuls of rice were made up into smaller ones at the river store in order to facilitate their transport through the jungle to the mine; the small bags had no distinguishing marks, but through the courtesy of the General Manager of the Company I am able to show the exact amount of fresh rice that was stored during the year 1905.

The accuracy of the data given in the attached tables C and E can, I know, be relied upon, they have been prepared for me by the Chief Accountant of the Company. The figures, although complicated, are worthy of close attention.

In connection with table C, it is very important to remember that there can be no doubt that the tendency was to pile the bags of fresh rice on top of the older ones, and that until the rice began to be transferred from the river store many of the oldest bags were necessarily at the bottom of the stacks.

TABLE C.
SHOWING THE VARIATION IN QUANTITY OF FRESH RICE IN USE IN 1905.

Months	Amount of fresh rice stored during the first half of the month	Total amount of rice issued during the first half of the month	Amount of fresh rice stored during the second half of the month	Total amount of rice issued during the second half of the month
	Pikuls	Pikuls	Pikuls	Pikuls
January	16.93 $\frac{1}{2}$	93.00	92.09	23.45
February	79.86	46.95	86.04	18.35
March ..	16.01	57.30	54.23	24.07
April ..	120.36	40.67	23.96 $\frac{1}{2}$	76.20
May ..	6.82	82.58	—	40.82
June ..	81.79	84.93	87.83	27.12
July ..	136.95	75.44	100.74	27.30
August ..	111.60 $\frac{1}{2}$	64.90	25.27 $\frac{1}{2}$	30.32
September	86.06 $\frac{1}{2}$	95.45	163.81 $\frac{1}{2}$	20.70
October ..	84.76 $\frac{1}{2}$	67.11	39.24	51.00
November	24.30	62.97	54.13 $\frac{1}{2}$	24.50
December	23.88	41.70	—	25.10
Total ..	789.34	813.00	727.36	388.93

An examination of the above table shows that a very large quantity of fresh rice was stored throughout

the year but the store was very short of fresh rice in the first half of January. The 16.93½ pikuls was delivered in two consignments, one of which (5.96½ pikuls) was received as late as the 7th of the month and the other (10.97 pikuls) not until the 9th of January. It follows therefore that 76.06½ pikuls of the old rice left from 1904 were used, and that 27.99½ pikuls of it remained in the store.

Very little fresh rice was received in May (only 6.82 on the 4th of the month), but the maximum 249.88 pikuls was received in September, as well as large amounts (165.90 pikuls) in February, and 237.69 in July, but only 78.43½ in November, the greater part of which came in on the 20th of that month.

A more critical examination of table C. shows that 96.63½ pikuls of rice were in stock at the end of January, and it will be remembered that of this amount 27.99½ pikuls remained from the old stock of 1904; by deduction it will be found that, disregarding this amount of 27.99½ pikuls for the present, the remaining 68.64 pikuls may have remained untouched until the first half of June, when 3.14 pikuls of this old rice must have been issued. At the end of May, exclusive of the 68.64 pikuls, there would have been only 28½ cattles of fresh rice in hand. In the first week of June the greater part of the fresh rice (48.86 pikuls) was not received until the 13th day of the month and by far the greater quantity of rice was issued in the first half of this month as compared to the second half, and again, as regards the supply of the second half, 47.35 pikuls were received as early as the 18th of June. The labour force, it will be remembered, was greatly increased in May by a number of unacclimatised coolies.

It is not possible to supply an accurate statement of the days on which the rice was actually received by the Chinese contractors and other natives, through reason of the carelessness with which they presented their orders for rice at the store, but it may safely be presumed that the 68.64 pikuls with the old stock (27.99½ pikuls), was in use about this time and that the oldest of it had greatly deteriorated. This is corroborated by the Sumatran clerk, who tells me that he went on leave in February and found on his return in May that his substitute had neglected to endeavour to interchange the bags.

At the end of June, 126.55½ pikuls were in stock, including probably much of the 27.99½ pikuls left over from 1904, and on referring again to the bills of lading of the boat service, I found that the greater part (97.70 pikuls), of the fresh rice for the first half of July did not arrive until the 8th day of this month, while the greater part of that received in the second half (71.07 pikuls), came in as early as the 17th of July.

The Mining Accountant at the Sokor camp has kindly given me a note of his weekly balances of the rice in stock at the river store from May, 1905, until December; they were lowest on June 17th (90.68 pikuls), on June 9th (90.98 pikuls), on May 27th (94.61½ pikuls), on May 30th (126.96 pikuls), on June 24th (125.31 pikuls), and on July 1st, when there were 140.61 pikuls.

There can be no doubt, I think, in concluding that either stale or greatly deteriorated rice was in use at

the end of December, 1904, during the first half of January, 1905, in May, at the beginning and end of June, at the beginning of July and probably at the end of July; it was found in use in December, 1905, after the rice had been transferred from the river store to the new store-house.

A brief summary of the clinical history of the disease shows that beri-beri occurred markedly in the beginning of January, 1905, in May, in June, very markedly in the beginning of July, and in the beginning of August, and as the rice was transferred in September by means of a limited number of bullock carts, in the process of removal it may, I think, be reasonably supposed that the oldest bags of rice then came into circulation, but this may have been delayed owing to the very large supply of fresh rice which was received in September, on account of the coming of the north-east monsoon season.

In September and October the advance of the disease was arrested, but only to again progress in November and December.

The labourers in the Sokor district comprise chiefly Chinese, and for surface work a few Javanese and some Kelantan Malays. The Chinese are divided into two classes, the Hailams, who are immigrants from Hainam, and the Khehs, who come from a district north of Canton. Both classes form the mining coolies and each work in separate gangs under a contractor or contractors of their own class. Besides Chinese miners there are a few fitters and other Chinese who are not working under contract. The proportion of cases and deaths from beri-beri among the Chinese is shown below in table D.

TABLE D.
SHOWING THE PROPORTION OF CASES AND DEATHS AMONG
THE CHINESE IN 1905.

Months	HAILAMS UNDER CONTRACT		KHEHS UNDER CONTRACT		OTHER CHINESE		TREATED IN HOSPITAL		TREATED AS OUT- PATIENTS	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
January ..	—	—	2	2	—	—	1	1	1	1
February ..	—	—	—	—	—	—	—	—	—	—
March ..	—	—	—	—	2	—	—	—	2	—
April ..	1	—	—	—	—	—	—	—	1	—
May ..	4	—	2	1	3	—	5	1	4	—
June ..	11	—	6	—	—	—	10	—	7	—
July ..	18	2	9	3	1	1	8	5	20	1
August ..	2	—	6	1	2	—	—	—	10	1
September ..	1	—	2	—	1	—	—	—	4	—
October ..	—	—	5	—	—	—	—	—	5	—
November ..	5	1	4	1	—	—	8	1	1	1
December ..	6	1	1	—	—	—	6	1	1	—
Total ..	48	4	37	8	9	1	38	9	56	4

It will be seen that the Hailams suffered most in July—18 cases with 2 deaths, also the Khehs in July—9 cases with 3 deaths, and that the only death which occurred among the other Chinese was in July. On turning to the hospital registers it was found that out of the 18 cases reported during the first half of July, no less than 13 occurred during the first week,

and that all the deaths, as shown in table B happened, with the exception of one, to be in the first half of the month. All the cases mentioned in this paper were of the male sex; there were only three Chinese and very few Malay women in the camp.

Reverting to the supply of rice from the store it may be seen that the Hailams and the Khehs, as well as the other natives, obtained very large supplies of rice during the months of May, June and July, but comparatively little in February. The amount purchased by them and other natives is shown in table E.

TABLE E.

SHOWING THE AMOUNT OF RICE PURCHASED BY CHINESE AND OTHERS IN 1905.

Months	Hailam Contractor	Kheh Contractor	Other Chinese	Javanese	Malays
	pikuls	pikuls	pikuls	pikuls	pikuls
January ..	44.49	15.00	5.50	7.40	15.39
February ..	35.00	16.00	2.90	4.60	9.40
March ..	37.00	27.00	4.00	3.00	8.87
April ..	46.00	26.00	3.65	6.00	5.47
May ..	47.00	40.50	6.90	4.00	5.80
June ..	37.12	41.00	7.10	7.00	6.02
July ..	38.00	39.50	2.70	—	3.20
August ..	23.00	43.00	3.90	—	5.50
September ..	23.00	38.00	3.95	5.00	8.85
October ..	26.00	38.00	2.30	3.00	22.85
November ..	21.00	28.00	1.70	—	17.36
December ..	16.00	24.00	1.50	4.50	9.00
Total ..	393.61	376.00	46.10	44.50	117.71

BERI-BERI AS IT AFFECTS MALAYS.

It is now of telling interest to refer to the outbreak of beri-beri among the Malays and Javanese in the Sokor district. Malays, speaking generally, have no tendency to beri-beri, and they do not, as a rule, eat imported rice, but prefer to eat that which they plant and grow in their own country.

This rice is very seldom stored by them in their houses, unless in the form of paddy or rice in the husk; we have seen that this is very liable to go mouldy if stored. The natural custom of the Malays is to pound small quantities of their paddy into rice for cooking, and use it fresh, from day to day, as may be required for their household use. This exertion is undertaken by the women folk, who do not, as a rule, follow their people to the mining camps. One of the Malay patients in the Sokor district told me that although the Rangoon rice was very convenient, he could not afford to buy it all the year round as it was so much more expensive than the Kelantan rice, and he remarked naively that it always smelt of the bag even after it had been well washed and cooked.

The Malays in the Sokor district have always been in the habit of buying most of their rice at a village called Kusial, some fifteen miles distant, but, during the north-east monsoon season, owing to the wild weather and to the greater difficulty of jungle transport, they always buy Rangoon rice from the company's store in comparatively large amounts, as may be seen in Table E. It is significant that these Kelantan coolies, among whom beri-beri is unusual, should have escaped in June and July but should

have succumbed in December, when they were eating the bad rice.

The weather in January, 1905, was remarkably mild for the north-east monsoon period, the total rainfall for this month only being 5.22 inches, and, under these circumstances, Malays could have obtained Kelantan rice from the village of Kusial. Malays in the Sokor district are too independent by nature to associate intimately with the Chinese, but will fraternise and eat rice with the Javanese. It will be noticed that the latter also laid in a comparatively large supply in January, February, and December, and probably for the same reason, but their mode of buying it from the store was quite different. The Malays invariably buy rice from the store in small quantities of about 40 to 80 catties at a time. The Javanese, who cannot so well afford the time to go to and from the store so often, always take their supply in bulk; for instance, in January they took the whole of their rice (7.40 pikuls) on one day, and in June their 7 pikuls in two portions on the 3rd and 15th of the month. In March, when I examined their diets, there was a good supply of fresh rice, namely, at the end of February, 169.24 pikuls (deducting again the 27.99½ pikuls), rather less at the end of March (158.11 pikuls), and a good supply at the end of April, namely, 185.56½ pikuls. It is curious that there were no cases of beri-beri among all the nationalities in February; only two in March among the Chinese, and one in April, months in which there was a good supply of fresh rice in use, and it may be of importance to recollect that rice, although mouldy or infested with worms, may be dried and winnowed in such a way that there is no apparent difference to the naked eye between it and rice which is known to be good.

EXPERIMENTAL TESTS.

The only experiments which I was in a position to make were of a simple nature. Equal quantities (two ounces) of fresh Rangoon rice, mouldy rice and rice infested with worms were well washed, thoroughly cooked and set aside in the open air for forty-eight hours. At the end of that time a greyish mould appeared first on the mouldy sample and this was quickly followed by a light brick-red mould, which in point of time next formed on the sample taken from the bag infested with worms, but only appeared slightly on the sample of fresh rice at the end of the third day. Fresh Siamese and fresh local Kelantan rice were treated in the same way and the pink mould did not appear on either until the third day, and then first in point of abundance on the Kelantan rice. From the preceding experiments it would appear that mould on rice is not destroyed by boiling, as it formed sooner on the bad samples of rice than on the good samples.

It seems not unlikely that Chinese cooking pans, unless thoroughly cleaned daily, might become contaminated in this way, as well as tubs of water in which rice bowls and spoons are washed on the conclusion of a meal, by reason of rice falling into the tub and decomposing therein.

To remark, in conclusion, on the occurrence of beri-beri in the Sokor district, a small place in the jungle of a new country, where the means of communication

are not good and where it is necessary to store a large quantity of imported rice, no management, however carefully thought out, could, I think, prevent a loss through deterioration. It is the usual experience in all mining camps in this part of the world, where climatic conditions are very unfavourable for the storing of this kind of food supply. I think it would be unfair also to brand Rangoon rice in particular as being specially unwholesome; most, if not all, of the other varieties of rice for sale in the East would, I think, sooner or later deteriorate in the same way under the same conditions. A solution of the difficulty in fertile places where rice in the husk can be obtained cheaply, might be to mill the local rice on the spot in such quantities as may be required from time to time, but other cereals, especially those which are supplied in bags, may also become mouldy or otherwise deteriorated. Besides these, also in local use, are sago and tapioca, which are exported to Europe from Singapore, as well as "dal," a small green pea which is imported, and three or four varieties of beans which are used locally, especially by the Chinese, who also favour two kinds of dried mushrooms.

I am indebted to Mr. W. Graeme Anderson, of the mining department of the Company, as well as to the General Manager and the Accountants for the help which they have given me in preparing these notes.

REFERENCES.

- [1] BRADDON. "Medical Archives of the Federated Malay States," p. 26. Kuala Lumpur, Selangor Government Printing Office, 1901.
- [2] LUCY. *Journal of the Malaya Branch of the British Medical Association*, New Series, No. 2., page 41, Singapore, 1905.
- [3] HOSE. *British Medical Journal*, p. 1098, vol. ii., 1905.
- [4] TRAVERS. *Journal of Tropical Medicine*, p. 23, August, 1902.
- [5] KUALA LUMPUR. *The Malay Mail*, January 23rd, 1906, Selangor.
- [6] GIMLETTE. *Pahang Government Gazette*, No. 13, vol. v., July, 1901.
- [7] GIMLETTE. *Supplement to the Pahang Government Gazette*, June, 1898.

"Lancet," July 7, 1906.

THE ACTION OF THE SERUM OF VARIOUS MAMMALS ON THE
PLAGUE BACILLUS.

Lamb, G. and Forster, W. H., from experimental research in the serum of man, monkeys, horses, oxen, sheep, goats, rabbits, guinea pigs, and rats, conclude that no bactericidal action against the bacillus pestis is resident in the serum of any of these animals. In fact, the serum of all the animals mentioned proved to be an excellent medium of cultivation. To whatever, therefore, the immunity of some animals against plague is due, it would not seem to be resident in the serum.

"Il Pollicinico," June, 1906.

RONTGEN RAYS IN MALARIA.

Demarchi, A., concludes from experiments that X-rays have no effect on the course of malarial fever, either as regards relapses or on the development of the parasites. The reduction of the size of the spleen noted after treatment by X-rays only sets in when the parasites have disappeared from the blood by medicinal treatment.

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RESIDENTS.

HARROGATE.

EVERY one knows about Harrogate, although they may never have been there, and we are reminded of its existence from time to time by elegant pamphlets detailing its virtues. Perhaps more than any other Spa in Britain is Harrogate visited by patients from warm climates in summer; they are sent thither by their doctors for the most part, but as often as not the doctor is asked, "Do you think Harrogate would suit me for a change?" Patients from the tropics suffering from the common Tropical ailments of liver or malaria do well at Harrogate during Summer. For such patients the seaside is useless, and worse than useless, it is harmful.

During the months of July and August those who have come home with malaria, anæmia, and enlarged spleen are almost certain, if resident in a town in the South of England, to get fever, probably of a remittent type, for two or three years after settling at home. Nor does the trouble cease there, for as the hot weather of July returns during several, it may be many, subsequent years, ailments such as neuritis, gastric catarrh and hepatic congestion, lumbago and several minor but annoying and depressing conditions

seem to assert themselves. What is to be done with patients suffering from their summer relapses of old malarial infection? Send them to a seaside town on the South Coast, because it is the nearest approach obtainable without going abroad to the climate from which they came? No, the sea level favours hepatic congestion, and the malarial parasite or toxin thrives in the warmth. Send the patient to a Continental Spa? People who have been abroad for many years do not want to be sent away as soon as they reach home; if they are ill they do not care to be amongst strangers, and if they are suffering from any form of tropical ailment they would be well to keep away from Continental Spa doctors, whose practice consists of "curing" the congested livers of over-fed European residents, and not the run-down tropical-marked and bleached specimens of humanity one is wont to meet with amongst old Tropical residents. A Continental Spa? No! Where, then, are there any principles to guide us in choosing a place of "cure?" High ground, bracing air and a fairly cool atmospheric temperature are the three requisites for a place suitable for "delicate" tropical residents in the months of July, August and September, for at least five years after their return from the Tropics. In England we must go northwards for these requisites, and at Harrogate, Buxton and Matlock we find for the most part what we require.

The Harrogate urban authorities are evidently quite alive to the commercial value of an impressive and pleasant environment to enhance the attractions of their valuable possession—the mineral springs. The Stray, an open space really of some 200 acres, runs through the centre of the town; its well-kept paths and plots testify to the attention bestowed upon them. The Royal Baths building in Harrogate is acknowledged to be the finest in Europe, and yet few English people have ever even heard of them. Continental spas and their doctors' names they know intimately, and can tell off-hand the nature of the waters at each and the ailments they are good for; but British Spas, their waters and their doctors are unknown to the majority, and, as usual, the Briton's ignorance of what he has in his own favoured isle is supreme. What is it that is wanted? A kursaal, beautiful walks, interesting surroundings, or is it medicinal waters, baths and treatment. In Harrogate there are all these, and there is the cool bracing air of Yorkshire, which is perhaps the greatest attraction of all. The advice to be given to tropical patients resident in England as to where to go in summer, is simple enough. Harrogate or Buxton in England; Morayshire, Nairnshire or the east of Ross-shire (Strathpeffer) in Scotland; or inland in Norway. At other seasons of the year there are British spas further south, where the invalid from the tropics will find himself or herself in congenial surroundings. Each place has its season, and, by judicious selection, the resident abroad can spend his leave or choose his holiday at places within his native shores—at home, in fact, for any part of Britain is home to those who have been long resident abroad.

The mineral waters of Harrogate are, however, after all, the essence of the "cure." This fact is apt to be forgotten, not only through the attractions and

environment of the town, but the varieties of treatment at the baths are so numerous and so elaborate that the medicinal properties of the waters run a chance of being relegated to a position of but little importance. This should not be so; at any place we can have douches, needle baths, liver packs, massage with all its infinite and detailed varieties; but the Harrogate waters are Nature's gifts, and it is for these we seek after the place. Harrogate is doubly gifted in this respect, for it has a sulphur water, and a chalybeate and iron water. We cannot supplant natural waters by any artificial laboratory production. The chemist's analyses may be perfect, and his synthetical combinations may be exact; yet he cannot give us what Nature supplies to us. So it is with the mineral waters, we must go to them; they cannot be brought to us, nor made for us. Were we to attempt to imitate the sulphur waters of Harrogate by prescription, it would extend to a length which even the physician fond of drugs would scarcely dare to imitate. The constituents of these waters consist of: Sodium sulphhydrate, sodium sulphide, barium chloride, strontium chloride, calcium chloride, magnesium chloride, potassium chloride, lithium chloride, ammonium chloride, ammonium carbonate, sodium chloride, sodium silicate, magnesium bromide, magnesium iodide, calcium carbonate, magnesium carbonate, ferrous carbonate, potassium carbonate, sodium carbonate, sodium iodide, barium sulphate, barium carbonate, strontium sulphate, strontium carbonate, calcium sulphate, sodium nitrate, silica, sulphuretted hydrogen, carbon dioxide, carburetted hydrogen, nitrogen.

The effect of the combination of these salts and gases upon each other, who will venture to elucidate? and the physiological chemist may well stand aghast when asked to state what their combined effect may be when introduced into the human alimentary canal. Yet such is Nature's plan of prescribing, and we are left in wonderment, wholly incapable of imitating or understanding her methods of combination to effect a cure.

(See also *Cheltenham*, p. 274).

THE DEPRECIATION OF THE ATTRACTIONS OF THE INDIAN MEDICAL SERVICE.

In previous articles we have already drawn attention to some of the causes that tend to mar the efficiency of the Indian Medical Service and to lessen its attractiveness as a field for professional enterprise, but have hitherto confined ourselves to points of a public character rather than to those that concern the prosperity of the individual officer. On the present occasion, however, we propose to consider a point of the latter sort.

There can be no doubt that the privilege of engaging in private practice has contributed enormously to the efficiency of the Indian Medical Service and to its popularity as a career; and, so far as we are aware, it has never been pretended that it has been abused to the detriment of the public service.

Anglo-Indians outside the medical service have always held most exaggerated ideas as to the emolu-

ments obtainable from the service, but still, twenty years ago, any civil surgeon might fairly expect to supplement his pay by £100 to £200 a year from this source, and in the larger stations his income might even equal that of a covenanted civilian of his own standing. All this, however, is a thing of the past, as far as the smaller stations are concerned, and is woefully diminished in the larger.

In each province there are some few stations which still retain some attractions from this point of view, but these are very properly the reward of prolonged good service, and, practically speaking, up to fifteen years' service or thereabouts, the less an officer expects to gain from this source the less will he be disappointed. There are various causes for this. In the first place, we have trained in our Indian universities large numbers of highly qualified native practitioners, whose habits of life enable them to charge fees much smaller than it would be either remunerative or fitting for an European officer to accept, and to this may be added the unavoidable unpopularity of all medical men trained on the European system, as the outcome of the efforts of the Indian Government to cope with plague. Owing to this a large proportion of patients who in old times would have consulted the civil surgeon or his assistants, according to their means, now resort to the *unani haqim* or Hindu baid, and it is only when these have failed and the sick man is past all human aid, that the European practitioner is called in, and when he is so, it is obvious can expect but scanty emolument or credit from the contingency.

All these adverse conditions might, however, be expected to yield to the personal influence of a really skilful and energetic officer, were it not for the needless way in which medical officers are harassed by constant changes of station. A remunerative private practice can no more be built up in a day or a month in India than in any other country, but an individual officer's tenure of any station rarely exceeds a year, and is often a matter of a few months only. An amiable desire on the part of the powers that be to treat their servants fairly is no doubt largely responsible for this, but to the victims of this misplaced affection the results are little short of ruinous. To account for how this comes about it is necessary to explain the plan on which the Civil Surgeon's official emoluments are calculated. The Government first docks fifty rupees from his military pay, and then compensates him by certain additional charges, the value of which varies in different stations. Thus the superintendentship of a district jail is paid from 50 to 150 rupees a month, and in the majority of stations this is the only additional charge, but in other places there may be the medical charge of a railway, of a lunatic asylum, coolie department, remount establishment, &c. To give an example: in the Punjab, the Civil Surgeons of Simla and Murree draw 50 rupees per mensem less than their military pay, while those at Heshiapur and Gujrat find their position unaltered. Ludiana and Hirsar draw 25, Gujranwalla, Ferozepur and Delhi 50, and Multan 100 rupees more than their military pay. Now, in order to give all their share of these good things, it is customary when a senior goes on furlough or retires to institute a sort of game of general post, each

officer stepping up into the next best place; but as the expenses of the move, for which he is allowed a fare, two first class fares swallow up one or two months of his entire pay, he is far from being a gainer by the change, and we would plead that greater consideration should be exercised in this respect, and that all unnecessary changes should be avoided, the more as they are even more undesirable from the official point of view than they are on private grounds, for local knowledge is of the first importance to the efficient conduct of a civil surgeon's duties.

Hitherto we have been considering the position of the ordinary civil surgeon, but in the political branch of the service the conditions are far worse, and are the outcome of deliberate efforts on the part of Government to reduce this source of income.

Indian noblemen are accustomed to regard it as only consonant with their position to reward handsomely their professional advisers, and generally the amount of the fee was left to the patient, though usually the sum tendered was only about what would be expected by a leading practitioner in England from a wealthy client. Some years ago, however, a native chief, choosing to consider that he owed his life to the exceptional skill of his medical attendant, presented the latter with the handsome fee of a lakh of rupees, or about £7,000. The gift, though princely, was, it must be remembered, entirely spontaneous, and astonished no one, probably, more than the recipient. The Indian Government, however, which had hitherto made no regulations on the subject, ordered the officer to refund the entire sum, but he preferred to send in his papers, and has since, by his talents and originality, attained a far better position in England than he could have ever expected to gain in India. Thereupon were instituted a series of orders on the subject, which have gradually been made much more stringent, till they are now so inquisitorial and humiliating that some officers prefer to refuse all remuneration rather than be subjected to the indignity involved in claiming a fairly earned reward.

Charges which would be regarded as reasonable in any part of England, and which have been passed as moderate by the medical administration are returned to the latter, it is said, with some insulting endorsement such as "perfectly monstrous," and officers have been left without any payment whatever, and punished for making charges based on the ordinary scale of fees customary in India. For example, the heir of a reigning chief was affected with a chronic tubercular bone affection. For over a year the Agency surgeon was in daily attendance, and often called up at night. He kept an account of his visits and charged the ordinary Indian fees, but the claim was rejected as excessive, and he was further punished by removal, not receiving a penny for his long and anxious attendance. The indignant chief, naturally considering himself dishonoured by the transaction, refused to call in the new Agency surgeon and resorted to a native haqim, who, of course, had no medical training whatever in the European sense, and this worthy really did charge in a style that might fairly be called monstrous—but as the haqim was a free agent the chief had to pay. The net result was gross injustice to the unfortunate medical officer, deprivation of proper medical treat-

ment to the patient, and an extortionate bill to his father, the chief. As a matter of fact it is practically most desirable that Agency surgeons should act as medical attendants to the chief when the latter desires it, for the friendly relations that necessarily result between him and a member of the Agency staff, are frequently of the greatest value in smoothing over difficulties, and everyone "in the know" is aware that it is quite common for the wholesome influence so gained by medical officers to "save a situation."

There is no good reason whatever why these humiliating regulations should not be entirely abrogated. No regulations could possibly prevent a really unscrupulous man from quietly accepting what he would be perfectly right in considering was honestly his due, and the mere fact that they suffice to prevent this is enough to show that the service is not made up of men of the sort, and that the rules are therefore quite needless. Further, they are resented by the chiefs even more acutely than by the medical officers, for they naturally argue that if they may not choose their own doctor, and honestly pay his bill, they are far less free agents than persons who have not the misfortune to be "ruling" chiefs.

As a rule no other qualified medical man is available, and the outcome is that they must either do without proper medical attendance, or be placed in a most disagreeable position of obligation to a man whose income is a mere bagatelle compared with their own.

Enough, however, has been said to show that the interference with private practice of this class is useless and needless, and that it is vexatious and humiliating to all concerned, and to none more than to the persons it is ostensibly designed to protect.

We should be the last to deny that the Indian Government has not only the right but the duty of maintaining the highest possible standard of professional honour in all branches of the service, and with human nature what it is, it is inevitable that cases should occur which call for the strictest disciplinary action.

Far from regarding such severity with disapproval the members of the service would be the first to applaud the prompt dismissal of an extortioner or blackmailer, but perhaps not the least extraordinary feature of the case is the reprehensible levity with which one or two such cases that have happened in the last twenty-five years have been dealt with. That such men should be given "another chance" is simply regarded as a blot to the fair pages of the nominal roll, in which the Indian Medical Officer justly feels the greatest pride.

No one denies that such cases will occur, and must be dealt with, but this is no defence for legislating for an honourable service, as if its members were a den of thieves; and as long as these rules are retained it is impossible for the Indian Medical Officer to feel that he is being treated not only as an officer, but also as a gentleman.

TUMOUR AND CANCER AMONG THE NATIVES OF ANGOLA.

DR. F. CREIGHTON-WELLMAN, Benguela, West Africa, in a communication to the American Society of Tropical Medicine, states that malignant tumours are uncommon amongst the natives of the district in which he is quartered. Of non-malignant tumours keloidal fibromata are by far the most numerous. The actual figures are:—Sarcoma, 2 cases in young women; multiple fibromata, 1 case; keloidal fibromata numerous; myxoma 1 case of nasal polypus; chondroma, 1 case; papilloma, warts, cutaneous horns, and bilharzial papillomata, rare; lipoma, several; hydrocele, not uncommon.

Dr. Wellman's experience extends over several years, and he has had the opportunity of examining many natives.

THE BIRTH-RATE IN THE PUNJAB.

EFFECT OF PLAGUE AND MALARIA.

THE sanitary authorities in the Punjab state that the influence of plague on the birth-rate is of an indirect and general nature only; and that in spite of the fact that there were 334,897 deaths from plague in 1905, the birth-rate in the Punjab rose from 41.5 to 44.4 per thousand of the population. It is noticeable that more women than men die of plague in the Punjab, a fact probably owing to women being secluded indoors and therefore more in contact with the sources of infection. The birth-rate would seem to be lessened more markedly by the prevalence of malaria than of plague. A severe malarial outbreak in the autumn is reported to affect the birth-rate in the following year more than any other form of disease. For four years in succession the death-rate in the Punjab has been higher than the birth-rate; and the Punjab has recently had the highest death-rate of any district of India, amounting to no less than 47.55 per thousand.

PRIZES OFFERED FOR DISCOVERY OF THE TYPHUS FEVER GERM.

THE Mexican Government have offered three prizes of \$20,000 each for (1) the actual discovery of the typhus germ; (2) its mode of transmission to man; (3) and of a successful preventive or curative serum or effectual remedy. Communications to be addressed to the Secretary of the Academy, Dr. D. I. G. Cosío, Ortega 9, Mexico.

The reason for this liberal offer is that typhus is prevalent in a part of Mexico at the present time where, under the name of "tabardillo," the disease has attacked some 860 persons, of whom 185 have died. Dr. Terres, of Mexico, has published several facts in connection with the prevalence of typhus in Mexico. He states that the disease is not transmitted by direct contact; that it is seldom met with below an altitude of about 2,000 feet, whilst it is endemic in nearly every town above this altitude; the disease is especially prevalent during dry seasons.

Dr. Ignacio Prieto, of the National Pathologic Insti-

tute, Mexico, states he has isolated a streptococcus from the cerebro-spinal fluid of typhus patients, which he thinks may be the causal germ. It frequently appears as a diplococcus. Inoculation of animals has proved positive, the time of death varying according to the strength of the injection. There is said to be some difference in the clinical signs between the Mexican and the European type of typhus, in as much as the Mexican variety does not reach its maximum temperature for three or four days. Moreover, the temperature is first intermittent, then remittent, and finally becomes continuous in the Mexican variety.

Notes and News.

MOSQUITO BITES.—Schill, in the *Schweizer Woch. für Chemie und Pharmacie*, advises applying a paste or saturated solution of bicarbonate of sodium to the bitten part. Thymol, 50 per cent. alcoholic solution, applied to hands, neck and face, is effective in keeping off mosquitoes.

EUROPEAN AND AMERICAN AILMENTS.—At one time gout, glycosuria and multiple sclerosis, were regarded as rare diseases in the United States of America, and in text-books the rarity was insisted upon. Whether the people of the United States were really less seldom afflicted with any one of these troubles than were the European parent stock, is a matter of opinion. At the present time, however, the several ailments mentioned are as prevalent in one Continent as in the other.

AN INGENIOUS MOSQUITO DESTROYER.—Professor Blanchard showed at a recent meeting of the Académie de Médecine, Paris, an invention by M. Chaulin, devised to destroy mosquitoes. The apparatus consists of a small metal cage within which is an electric light. The cage is connected with a battery whereby an alternating current is made to traverse the wires of the cage. The mosquito is attracted by the light to settle on the wires and is promptly electrocuted.

MISS R. A. BETTY, Senior Lady Superintendent of Queen Alexandra's Nursing Service for India, has been decorated by His Majesty King Edward with the Royal Red Cross, in recognition of her services in India.

ST. HELENA.—According to the official report for 1905, measles appeared in March, 1905, and up to August 28th, 1905, when the last case occurred, no fewer than 500 persons were attacked. Seeing that the total population of the island amounts to only 3,761, it would appear that almost one-seventh of the inhabitants contracted the disease. No one died of the disease except one person, aged 52, who was also the subject of malignant disease. It is sixteen years since measles visited St. Helena, so that the low death-rate is rather remarkable.

ENTERIC IN INDIA.—STANDING COMMITTEE APPOINTED.—The Government of India have sanctioned

the formation of a Standing Committee for the purpose of investigating and advising on enteric fever in India and its prophylaxis. The first meeting was held at Simla on July 31st in the United Service Institute.

The undermentioned officers, nominated by the Commander-in-Chief, have been appointed on the Committee:—President: Surgeon-General Gubbins, P.M.O., His Majesty's Forces in India; Vice-President: Surgeon General Scott Reid, P.M.O., Northern Command; Members: Colonel Forman, P.M.O., Bombay Brigade; Lieutenant-Colonel T. P. Woodhouse, Captains L. W. Harrison, E. B. Knox (secretary), A. B. Smallman and Lieutenant Luxmoore, Royal Army Medical Corps. Nominated by the Home Department—Members: Lieutenant-Colonel Leslie, Sanitary Commissioner with the Government; Lieutenant-Colonel Semple, Director of the Central Research Institute; Major G. Lamb and Captain Greig, I.M.S.

A SMART shock of earthquake was felt at Simla and at Naggar (Kangra District) on July 21st, and slighter shocks at Lahore and Dalhousie.

INFECTIOUS DISEASES HOSPITAL AT COLOMBO, CEYLON.—News has been received that a lady travelling home with her children from Calcutta had a most unhappy experience at Colombo recently. One of the children developed small-pox at sea, and on arrival at Colombo, the family were taken to the infectious diseases hospital. Instead of finding a properly equipped hospital, Mrs. Craig and her children found a shanty with a couple of untrained Cingalese in attendance. The isolation rules prevented the mother from seeing her sick child, and the attendants were altogether unfitted to look after an European child of three years. The child died, and when the whole of the facts of the case were made known by Mr. W. J. Craig, who had been summoned to Colombo by his wife, the indignation aroused was general. Sir Henry Blake, the Governor, made a private surprise visit to the infectious diseases hospital and declared it to be a disgrace to the Colony. A site for a new hospital has since been decided on.—*Times of India*, July 28th, 1906.

THE annual (1905) report on vaccination in Burma states that: "Out of a population of 10,500,000 the total number vaccinated were 500,000. Two hundred vaccinators were employed; the cost of the work amounted to 114,000 rupees."

WE have to hand the current "Special Plague Number" of the *Indian Medical Gazette*, which should be obtained by all interested in the subject, as, for the most part, the papers included in it are of a high standard of excellence and are, moreover, of a most practical character. Perhaps the most noteworthy point is the fact that almost without exception, Captain Glen Liston's rat-flea theory of the etiology of plague is accepted as substantially proved; and such being the case we are obviously within measurable distance of a really practical and practicable plague policy for India. There are many Hindu

sects that would have some objection to the killing of rats, and who might, at any rate, refuse to assist in such operations, but except the Jains, who, like Gilbert's Koko in the Mikado, "can't kill anything," few would have any scruples as to the slaughter of fleas, so that the use of insecticides is not likely to rouse opposition. That the contributions should not be of uniform merit is only natural, and in one case it is certainly difficult to understand how the author persuaded himself that he had anything original to communicate. This paper is rendered all the more irritating by its slipshod English.

Here, no doubt, we have the keynote to the title selected for this paper, and it is one which cannot fail to be of very great interest to all medical officers in this country, and in particular to those engaged in efforts to subdue it.

This is a complete paragraph, and if anyone can say to what substantive the final "it" stands pronoun their powers of analysis must far exceed the average. Does the "it" refer to the "keynote," the paper, or the country? In view of such a gem of construction, one is left in doubt whether mere carelessness or ignorance has led the author to speak of *Pulex cheopis*, Rothschild, as "the" rat-flea. As rats commonly harbour several species of *Pulicidæ* no one of them can fairly be called "the" rat-flea; but if any flea has a right to the title, it is *Ceratophyllus fasciatus*, which is found on rats all over the world, whereas *P. cheopis* has only once been recorded in temperate climates, and—if so spoken of at all—would probably be better called "the jerboa flea." As, however, most fleas will attack a variety of hosts, it is misleading to speak of any of them as appertaining to any particular animal. After all this, it is not surprising to find that the writer regards the *de novo* origin of bacteria as possible, albeit not proven. Not the least valuable portion of this excellent number are the able series of editorial comments which together form a most handy commentary of our present knowledge of this most difficult subject.

MAJOR J. CHAYTOR WHITE, I.M.S., at present on leave in England, has been deputed by the Government of India to visit a number of Municipalities in England, with the view of studying the working of recent sanitary improvements.

CAPTAIN JAMES, I.M.S., in an interesting report, discusses the old idea that Kala-azar has any relationship with malarial fever, and appears extremely sceptical as to the so-called disease having any connection with the Leishman-Donovan parasite. It is interesting to note that the Government entomologist has found in Assam a "near ally of the tsetse fly," and suggests that it may have some connection with the disease. The *Indian Pioneer* very pertinently remarks: "If the scientific authorities do not hurry up the disease may have died out before its origin is discovered, for it is certainly decreasing steadily in virulence. In 1897 some 18,597 deaths were reported in Assam as due to Kala-azar; last year there were only 3,030." And in favour of Captain James' views it may be noted that there is no evidence of any coincident decrease, either of malaria or of the Leishman-Donovan parasitic disease, though in the

latter case too little is known as to the diffusion of the malady to render any conclusions practicable.

THE death rate from cholera in Eastern Bengal and Assam was last year more than double that of the preceding decade. In Dacca city the Civil Surgeon effectually stamped out the disease by prompt treatment of all tanks and wells with permanganate of potash. One is tempted to ask why this measure was not employed elsewhere; but we are aware that it is not always possible to carry out sanitary measures as could be wished in India; and the reason, in the present instance, is probably to be found in the political unrest which has attended the establishment of the new province. Dacca, however, is a great Mahomedan centre, and it is noteworthy that the members of this community, though sometimes accused of backwardness, are often less difficult to deal with in sanitary matters than their Hindu fellow-countrymen.

Personal Notes.

INDIAN MEDICAL SERVICES.

Arrivals Reported in London.—Major W. J. Buchanan, Major J. B. Jameson, Col. H. K. McKay, Captain J. C. A. Kunhardt. *Extensions of Leave.*—Lieutenant-Colonel P. D. Pank, 2 d. furlough; G. F. T. Harkness, 3 m., medical certificate.

Permitted to Return to Duty.—Lieutenant-Colonel P. D. Pank, Captain T. H. Symons, Surgeon-General W. R. Browne, C.I.E.

Postings.

Lieutenant Steel officiates as Assistant-Director, Bacteriological Laboratory, Bombay.

Captain R. F. Baird officiates as Civil Surgeon, Farrukhabad.

Dr. H. A. Macleod, Civil Surgeon (uncovenanted service) from Saharanpur to Mugaffanagar.

Captain U. S. J. Shaw officiates as Superintendent Royal Lunatic Asylum.

Lieutenant-Colonel Harrington officiates as Chief Medical Officer, Rajputana.

Major P. Haig, Residency Surgeon, West Rajputana States, to the additional charge of the Agency, Jodhpur.

Captain H. Mackenzie, services temporarily lent to Government, Punjab.

Lieutenant C. Henderson, 29th Lancers, to Burmah Military Police.

Major W. Vost to be Civil Surgeon, Gorakhpur.

Leave.

Major W. R. Clark, Civil Surgeon, Umballa, combined leave, 2 y.

Retirements.

Lieutenant-Colonel J. Maitland, Madras.

Senior Assistant Surgeon Captain Staggs, I.S.M.D.

LIST OF I.M. OFFICERS IN MILITARY EMPLOY, ON FURLOUGH.

Abbot, Captain S. H. L., 12 m., May 4th, 1906.

Anderson, Captain D.N.

Babington, Lieutenant J. W. H., 1 y., September 27th, 1905.

Baker, Captain D. G. R. S., 8 m., May 16th, 1906.

Bradley, Captain R. J., 8 m., April 2nd, 1906.

Brown, Captain H. R., 18 m., April 15th, 1905.

Buchanan, Major W. J.

Collinson, Captain W. J., 1 y., June 9th, 1906.

Cruddas, Captain H. M., 1 y., March 13th, 1906.

Earle, Major H. M., 1 y., April 29th, 1906.

Eyre, Lieutenant-Colonel, M.S., 18 m., September 23rd, 1905.

Fooks, Lieutenant-Colonel H., 19 m., March 28th, 1905.

Gilbert, Major C. E. L.
 Graham, Captain J. D., 1 y., April 16th, 1906.
 Groube, Captain G. P. T., 1 y., April 14th, 1906.
 Hagger, Captain R. L., 8 m., February 16th, 1906.
 Hamilton, Captain W. G., 17 m., October 5th, 1905.
 Hamilton, Colonel H., C.B., 6 m. 18 d., April 28th, 1906.
 Harkness, Lieutenant G. F. L., 9 m., February 15th, 1906.
 Harriss, Major S. A., 6 m., May 6th, 1906.
 Illius, Captain H. W., 1 y., March 19th, 1906.
 Johnson, Major C. A.
 Kirkpatrick, Captain H.
 Kunhardt, Captain J. G. G.
 Lee, Lieutenant-Colonel W. A.
 Lister, Captain A. E. J., 21 m., February 12th, 1905.
 MacKellvie, Captain M., 12 m., October 15th, 1905.
 MacRae, Colonel R., 7 m., May 4th, 1906.
 Maidment, Major F. G., 1 y., March 21st, 1906.
 Marr, Captain C. F., 1 y., April 24th, 1906.
 Mason, Captain W. G., I.S.M.D.
 Meakin, Captain H. B., 18 m., March 23rd, 1905.
 Murphy, Captain A., 8 m., June 6th, 1906.
 Parker, Captain C. S., 18 m., August 28th, 1905.
 Pinchard, Captain M. B., 18 m., August 12th, 1905.
 Pratt, Lieutenant-Colonel H. J.
 Pridham, Captain A. T., 7 m., March 18th, 1906.
 Reynolds, Captain L., 9 m., March 4th, 1906.
 Rodgers, Lieutenant-Colonel J. W., 52nd Sikhs, 1 y., January 26th, 1906.
 Russell, Major A. R. P.
 Sarkies, Lieutenant-Colonel C. J., 290 d., April 19th, 1906.
 Stephen, Captain J. P., 1 y., June 24th, 1905.
 Swaine, Lieutenant-Colonel C. L.
 Tate, Captain G., 1 y., October 3rd, 1905.
 Thompson, Captain F. T., 54th Sikhs.
 Tuke, Captain A. W., 9 m., May 1st, 1906.
 Turner, Major R. G.
 Whale, Captain H., 8 m., June 5th, 1906.
 Wilcocks, Captain R. D., 17 m., May 27th, 1905.
 Younan, Lieutenant-Colonel A. C., 1 y., March 1st, 1906.
 Youngerman, Lieutenant-Colonel E. P., 1 y., March 2nd, 1906.

INSPECTION OF ALLEN AND HANBURY'S WORKS AT WARE, HERTFORDSHIRE.

THE admirable way in which the arrangements for the representatives of the press on their recent visit to Messrs. Allen and Hanbury's factories at Ware, Herts, were carried out convinced the visitors, even before they left by special train from Liverpool Street, that a capable and enterprising spirit must be at the head of affairs, and that something out of the ordinary was in store for them. Those anticipations were more than realised, and a thorough inspection of the works and minute examination of the many ingredients employed in the manufacture of the firm's numerous capsules, lozenges, &c., and the celebrated Infants' Food, could leave no doubt that everything was of the finest and purest quality, and the processes of transforming the raw materials into the desired results were carried out under the best of sanitary conditions. The factories stand in their own grounds, comprising some acres of grazing land, occupied by a large herd of cows whose milk is used in a variety of Messrs. Allen and Hanbury's products. In these days of scares by potted and tinned foods it is always as well to do what one can to remove biased impressions, and so far as Messrs. Allen and Hanbury's packing and the supervision exercised in hermetically sealing and keeping air-tight their delicacies and preventatives of, and remedies for sundry, ills are con-

cerned, it is only right to say they could not be surpassed, and consequently a minimum of damage is likely to be caused to them by climatic influences.

CHELTENHAM.

THE OPENING OF THE NEW SPA.

FOR those who have spent the active part of their lives in warm countries, and as a place of education for their families there is no more desirable and popular town to reside in than Cheltenham. The education for children is excellent, both for boys and girls, and within the means of all. In former times Cheltenham was famous for its mineral waters, but of late years the reputation of the town as a place of "cure" has been unaccountably and most unjustifiably neglected. It is satisfactory, however, to know that as a place of "cure" the Cheltenham authorities have taken a step in advance, and the opening of the new Spa cannot fail to prove an attraction to many. Just now "Garden Cities" are much talked about in England as if they were something new, but we have in Cheltenham one of the finest garden cities, not only in England, but in Europe. Being an old-established resort, it is without the drawback of the much vaunted modern imitations. The *Journal of the Royal Institute of Public Health* remarks:—"It would be difficult to exaggerate the advantages of the place from the point of view of residence. It is well situated, the shops are admirable, and the means of amusement greater than at most English health resorts. The climate of Cheltenham is of a distinctly sedative type. The humidity is considerable, making the conditions particularly equable. It is, like most of our western and south-western stations, admirably, or rather pre-eminently, suited to the very old and the very young. For those who have done their life's work, especially in some tropical climate, such as India, there is no better place in Europe than Cheltenham. All this has been long recognised, and one has only to go to Cheltenham and make acquaintance with its inhabitants, to realise that the population is largely made up of people who have been abroad and those who have children to educate.

"From the spa point of view, the waters are comparable to those of Brides-les-Bains, St. Gervais, Homburg, Kissingen, and others, which contain chiefly the chloride of sodium and the sulphate either of sodium or magnesium, or both. Inasmuch as it constitutes the only drinking-water spa of this type in England, and, judging by the spirit which now seems to animate its authorities, it certainly ought to have a great future before it.

"Of the New Central Spa, which the Corporation of Cheltenham has recently established in the Town Hall, we may say at once that any town which is capable of building a Town Hall such as that which now graces Cheltenham, ought to be capable of anything in the way of enterprise to render the town successful and attractive from the health resort point of view. It would be difficult to imagine anything, even at Continental stations, more suited to the requirements of a health resort than the magnificent

building in which the Central Spa is now situated. It is, in fact, a casino of splendid dimensions, admirably designed and tastefully decorated.

"Cheltenham has this peculiarity, that its climate is essentially a winter climate, and there is no health resort presenting the same type of waters to which patients can be sent in the winter. This is an advantage of which the authorities would do well to make full use."

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

The "Indian Medicine Gazette," Special Plague Number, July, 1906.

(1) THE SPREAD OF PLAGUE.

Browning-Smith, S., Major I.M.S., from experiences gained in the Punjab, is of opinion that in the spread of plague (1) the rat is the principal disseminator; (2) that the rat is a necessary factor for epidemic bubonic plague; (3) flea prevalence is also necessary; (4) a plague epidemic will end with the disappearance of either the rat or the flea; (5) seasonal variations of plague depend on flea prevalence, the habits of man and the breeding of fresh generations of rats.

(2) THE NATURAL HISTORY OF PLAGUE.

Stevens, A. F., Capt. I.M.S., draws special attention to the disseminating agencies of plague and classifies them into: (1) Universal or territorial dissemination, mostly by travellers, merchandise, parcels and correspondence and by animals; (2) regional dissemination by contiguous (urban) and local (rural) dissemination; rats and rat-destruction sums up the whole subject of the spread of plague and the means we have of combating the disease.

(3) HOW PLAGUE IS SPREAD.

Gordon Tucker, E. F., Capt. I.M.S., suggests practical palliative measures for municipal authorities to carry out when brought face to face with an epidemic of plague. They are chiefly erection of temporary dwellings in open spaces near evacuated houses for the poor, and outside the city for the richer classes. Disinfection of infected houses where a family accepts inoculation. Special laws to ensure good rat-proof dwellings for stables and granaries. Destruction of rats.

(4) PLAGUE IN THE CITY OF MADRAS.

Ross, T. S., Capt. I.M.S., states that until January 20, 1906, indigenous plague was unknown. A few sporadic cases developed in different parts of the city, but although rats were found infected the disease never became generally prevalent. Some attribute the extraordinary exemption of anything like an epidemic of plague in Madras during all the ten years the disease has prevailed in India, to the absence of the *Mus decumanus*. The *Mus Rattus* and the *Nesokia bandicota* are met with, but the former is a non-burrowing animal and therefore does not pass from house to house freely for fear of being caught by the Bandicoot; in this way the Bandicoot has come to be regarded by some people as the means by which plague has been kept out of the city.

(5) HOW DOES PLAGUE SPREAD?

Elliott, Alex. M., M.B., mentions, amongst the several known means of spread, that cats are probable carriers of infection, and that from fleas taken off plague-infected cats,

plague bacilli may be obtained. An interesting case is the probable infection of a man in India who picked up a dead rat dropped by a vulture; the fact that the buboes proved to be axillary in this patient is also suggestive and instructive.

(6) THE EFFECTS OF RAT EXTERMINATION ON THE INCIDENCE OF PLAGUE IN A SELECTED AREA IN AZAMGARH CITY.

Walker, J. W., Capt. I.M.S., draws special attention to the fact that plague epidemics, in smaller towns at all events, seem to be particularly severe in alternate years. The experiment of killing rats and mice by baits consisting of bread sprinkled with the "Common Sense Rat Exterminator" was carried out in the south-eastern district of Azamgarh. The result when the epidemic of plague visited the city was satisfactory, in as much as thirty-two cases were recorded against 133 in the north-eastern quarter, where no steps against rats had been taken and where the people lived under much the same conditions. A point observed in the rat-free area was that cases imported thither do not give rise to the series of infection to be seen in places where rats abound. The investigation was carefully and scientifically carried out.

(7) HOW PLAGUE IS SPREAD.

Allehen Gill, C., Lieutenant I.M.S., is of opinion that the part played by man in the spread of plague is of equal importance to the rôle of the rat. A plague epidemic in any place is usually preceded or accompanied by a mortality among rats, but if this is inquired into, in most cases it will be clear that the rat infection has taken place from man. The rat-flea *Pulex cheopis*, is evidently the chief intermediary host between rat and man, but whether as a mere transmitter or as an animal in which the bacillus of plague passes through an evolutionary stage, is unknown.

(8) AN EXPERIMENTAL INVESTIGATION AS TO THE POTENCY OF VARIOUS DISINFECTANTS AGAINST RAT-FLEAS.

Hossack, W. M. C., M.D., of the Plague Department, Calcutta, contributes a very interesting paper on the subject of rat-fleas and their destruction. He draws attention to the difficulty of being certain that the fleas have completely disappeared from the rat fur, even after careful search. He also shows that fleas, after being immersed for a time in fluid disinfectants, may promptly recover when allowed to escape from the liquid, even after many minutes of immersion. He finds phenyl 1-500 (roughly two tablespoonfuls to a bucket of water) is an excellent pulicide, paralysing the flea in a few seconds and killing it in about one minute. Izal, cyllin and crude phenyl are equally efficacious, but the perchloride of mercury, even in strong solution, 1-250, was disappointing. He advises giving up perchloride of mercury solution, which is in common use in India, in favour of one of the others mentioned. It must be remembered, however, that phenyl, izal, &c., has little power as a germicide against plague, and as Dr. Hossack remarks the substance that will give the best results as a pulicide and germicide has yet to be determined.

(9) RAT-KILLING FOR PREVENTION OF PLAGUE.

King, G., Captain, I.M.S., mentions several varieties of rats met with in Bihar and adjacent districts of India.

(a) *Field Rats*.—(1) *Gerbillus Indicus*, locally named "Hurna" (the Indian antelope or Jerboa rat), a field rat; (2) *Mus Mettada*, locally named "Kuroch," probably a large northern variety of the soft-furred field rat of S. India; (3) a field rat resembling the "Kuroch" rat, termed locally "Churhowa," but which Captain King cannot classify; (4) the *Nesokia Bengalensis* (the Indian mole rat); (5) the *Nesokia Bandicota* (the Bandicoot), termed locally "Ghous," the pig-rat. Of these field rats, 1, 2 and 3 do not burrow in outhouses; 4 and 5 are rare in Bihar and do not burrow in outhouses.

(b) *The House Rats*.—(1) *Mus Rufescens*, termed locally.

"Gach Kachuha," lives in trees, roofs of houses and holes in mud, walls, &c.; (2) *Mus Alexandrinus*. These rats are closely related in habits and in the fact that the tails of both are distinctly black, distinguishing them from all other rats. The importance of this feature is apparent when it is known that these two species are the transmitters of plague, and that when the extermination of rats is determined upon, it is the tails of the black rats that should alone be paid for, as rats with yellowish tails or black with yellowish fur over joints are innocuous, so far as plague is concerned. It would appear that the "*Mus Alexandrinus*" is really the eastern variety of the European black rat, *Mus rattus*, which was abundant in Europe from 1347 to 1680, but is rare now, having been ousted by the brown (drain and cellar) rat, and by better housing and sanitation since the great plague epidemics in Europe between the above dates."

"Centralbl. f. Bakten," I. Orig., T. xl., p. 630.

THE ACTION OF *Aspergillus niger* AND *glaucus* ON CULICID LARVÆ.

Galli-Valerio, Bruno, and Rochazdi Jongh, J. The larvæ were placed in crystallising glasses, flasks, and casks of water, and sporulating cultures of the above species added. In the smaller vessels, the greater part of the culicids failed to survive the larval stage and only half the pupæ reached the adult condition. In the larger vessels the mortality was less severe, and the authors conclude that though in the natural state the larvæ may become infected, the method cannot be recommended as a practical measure, as the destruction dealt by either petrol or saprol is much more rapid and certain.

"Thomson Yates and Johnston Laboratory Reports," T. vi., Part 2, p. 139.

THE HABITS OF THE MARINE MOSQUITO (*Acartomyia Zammitii*).

Theobald, F. V., premises that there is little doubt that Malta fever is conveyed either by the above mosquito or by the biting fly *Stomoxys calcitrans*.

This mosquito is found throughout the Mediterranean littoral and is exceptional in passing its larval and pupal stages in salt marshes of a concentration of 48 to 87 grammes per litre. Should the salt commence to crystallise out the larvæ must either emigrate or die. Interesting details are afforded of the larval and adult life history of the insect. It may be remembered that Sergeant has described from Algeria *Grubhamia maria*, a closely allied form, which also passes its larval stage in strongly saline salt marshes.

"C.R. Acad. Sciences," T. cxlii., p. 260.

THE ANATOMY AND HISTOLOGY OF THE IXODES.

Bonet, A.—A short study of the eye and poison glands of these arthropods. The poison glands consist of large pyriform cells, placed among the alveoli of the salivary glands, and distinguishable by their staining in acid solutions. They are more numerous in *Argas* than in *Ixodes*, which explains the greater irritation produced by the bites of the former genus. Their secretory activity is associated with nuclear emissions of the same character as the venom granules of other arthropods and of the ophidia.

It may be noted that the poison glands of mosquitoes also consist of similar voluminous pyriform cells.

"Scientific Memoirs of the Med. and Sanitary Departments of the Government of India."

THE ANATOMY AND HISTOLOGY OF TICKS.

Christophers, Captain S. R., concerns himself principally with *Rhipicephalus annulatus* and *Ornithodoros savignyi*, the latter being probably the camel tick, which Palton noted as also attacking man at Aden. A very complete account is given, with ample indications as to methods of

examination, and in the last chapter some information is given on the structure of the egg and the embryology of the group. It is important to note that it is stated that the larvæ of *Ornithodoros* do not bite, whereas those of the *Ixodidae* do.

"C.R. Acad. Sciences," T. cxlii., p. 1225.

THE EVOLUTION OF THE GYMNASPOROUS GREGARINES OF CRUSTACEANS.

Leger, L. and Dubosq, O., revive Frenzel's hypothesis that certain gregarines parasitic in crustaceans, for which the latter instituted the genus *Aggregata*, have a double life history, and that the alternative host should be looked for among animals that prey largely on crustaceans, such as the cephalopods, and have submitted the question to experimental demonstration. They have never found the spores of *Eucoccidium*, from the intestines of cephalopods, open in the intestines of these molluscs, although they do so readily in the intestines of a variety of species of crabs, and the sporozoites when set free are actively mobile, and penetrate the epithelial cells of the crabs very readily. The greater part of them are stopped by the basal membrane, and undergo degeneration, but those that succeed in passing through it reach the peri-intestinal lymphoid tissue and grow into large young gregarines with a spherical nucleus and large karyosome, though many are in the meantime destroyed by the phagocytes. These stages agree with those already described by the authors in crabs naturally infected with *Aggregata vagans*, and they are led to believe that these intestinal gregarines of crabs have no connection with the celomic *Aggregata*, but there is reason to believe that they require an alternate host.

They further believe that *Aggregata* is the schizogonic and *Eucoccidium* the sporozonic stage of the same gregarine.

"Journal of Mental Science," April, 1906.

Knobel, W. B., Dr., discussing asylum dysentery in England, points out (1) that between acute inflammatory conditions of the colon and lesions of nerve cells and fibres of spinal cord, ganglia and atrophy of cerebral gyri, there is a distinct association. (2) Trophic influence is evidently impaired in insanity, hence the special susceptibility of the insane to dysentery. (3) The 'privy atmosphere' with which we are familiar in asylum wards may be due to this trophic impairment, and the air in the ward may be a factor in the spread of the complaint. (4) Many microbes, either singly or in mixed infection, may produce dysentery under certain circumstances. (5) It may be that dysentery is produced by some microbe normally present in the intestine becoming pathogenic, when the normal nerve stimulus is withheld. (6) It is significant that disturbance of the subsoil in the immediate vicinity of an insane asylum is apt to be followed by an outbreak of dysentery.

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- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

SPRUE AND CHRONIC INTESTINAL LESIONS.

I.—THE DIET IN SPRUE—MEAT—MILK—FAST DAYS—WHY FAST DAYS ARE NECESSARY—SEA WATER FOR RECTAL INJECTIONS.

II. — SIGMOIDO-RECTAL STRICTURE A CAUSE OF CHRONIC INTESTINAL FLUX — A SIGMOIDO-RECTAL PYLORUS—THE USE OF THE SIGMOIDOSCOPE.

By JAMES CANTLIE, M.B., F.R.C.S.

I.

OPINIONS concerning the milk *versus* the meat diet of sprue, and of other lesions associated with intestinal flux, still afford material for debate. The majority favour the treatment consisting of milk only, a few favour a rigid *régime* of meat or of meat juices, whilst a third group temporise with a modification of the two extremes, and give a hesitating adherence to each. The writer has for years advocated and practised a rigid "meat" diet in sprue, and experience has tended to confirm the efficacy of the plan.

MEAT DIET.

Whilst still adhering to the meat treatment as the means of curing sprue rapidly and efficiently, an extended experience has served to modify the sweeping assertion that by this means alone sprue is always permanently cured. The reasons for this belief are stated below. That a patient in what under ordinary circumstances appears the last stages of the illness, that is, when, in addition to emaciation, anæmia, dropsical effusion, &c, there is a decided rise in temperature, can be saved by putting the patient on home-made beef tea, raw meat juice and beef jelly, administered in teaspoonful doses every ten minutes if need be, the writer has proved again and again. A rise in temperature takes place in most cases of sprue some two to four weeks before what seems inevitable death, in sprue. Milk in such cases means death, and by meat juices alone can a patient, in what seems the last stages of the illness, be saved.

The further treatment in such serious cases will be found to be that as the patient's strength improves, which it will do, the time of feeding may, after the first twenty-four hours, be lengthened to every twenty minutes on the second day, and to half hourly or hourly feeds by the third or fourth days. By the fifth day, pounded beef (from top of round) will be tolerated and enjoyed, and the diet intervals may be increased to two-hourly feeds; pounded beef, meat juice, beef tea, and beef jelly being taken *seriatim* at the intervals mentioned. In a week or a fortnight, if the cure advances satisfactorily, vegetables, bread and stewed fruit may be added with benefit. At this stage, or it may be later, a relapse usually occurs, and meat seems to have failed and the doctor and patient are disappointed. This contingency is almost inevitable, and the doctor reverts to milk, or the patient seeks

other advice. This is the critical period of the treatment, and one that causes anxiety and trouble. The solution of this difficulty is the object of this communication.

MILK TREATMENT.

This is so well known that it is unnecessary to describe it. It is the least troublesome to administer, it brings about, except in late stages of sprue, solid stools, and, the diarrhœa being in abeyance, the patient is satisfied with the result. Withal, however, it does not, as a rule, cure. A sprue patient can only be said to be cured when he can revert to a mixed diet, and it is at the period when other substances are added to the diet, be they starchy or nitrogenous, that a relapse is apt to occur and the patient and doctor are disheartened and disappointed. The solid stool produced by a rigid milk diet is not *fæcal*; it consists of a mass of agglutinated milk curd from which the whey has been extracted, and on the whey alone the patient has lived, and, it may be, improved.

Can the milk and meat diets be combined? In the ordinary sense, No! Meat cannot be digested when milk or milky substances such as milk puddings are given at the same meal. In ordinary day life it is the custom to take a milk pudding after consuming fish, fowl, or butcher's meat, and on the other hand milk is often drunk at meals along with meat in place of beer, or wine, or water. Such a combination is physiologically wrong. The old Jewish law that milk is not to be taken until at least two hours after eating flesh holds good for all time, and cannot be contravened with impunity by healthy people, and therefore far less so in patients with gastro-intestinal disturbances. How then can a milk and meat diet be combined if both are useful in sprue. Not by taking the two together; not even by taking the two at separate meals but on separate days.

FAST DAYS.

The patient on a meat diet should, say, every third or fourth day, fast from meat of every kind, and take milk, and milk only, for twenty-four hours. The writer has found this to be the secret of success in the prolonged treatment of sprue. Meat diet is almost certain to be attended by relapses; milk diet when modified is almost assuredly attended by recurrences of diarrhœa, and the ordinary attempts at a combined diet are equally productive of failure; but a rigid milk diet alternating with a varied diet on separate days will seldom fail.

WHY FAST DAYS ARE NECESSARY.

The writer has practised the "fast from meat" plan with success for some time, but could not frame an explanation until he read a paper by Sir Lauder Brunton on the effects of a rigid diet. In the paper and in conversations with Sir Lauder Brunton on the subject, the writer has come to firmly believe in his explanation of the good effects produced by meat fasts in cases of intestinal flux. Sir Lauder puts it shortly thus: The bacteria of the intestine can accommodate themselves to almost any food; if a milk diet has been persisted in, the sudden change to a purely meat diet places the bacteria, accustomed to deal with

milk only, at a disadvantage, they cease to be active and largely die out, and their pathogenic properties are annulled. If, again, the meat diet is persisted in the bacteria recover, and again multiplying become virulent, and show their pathogenic effects as pronouncedly as before. Change this suddenly and completely by again reverting to, say, milk, and the bacteria are once again hampered or largely killed; in time they become accustomed to the altered media of their environment and again become pathogenic. Whether this be the true explanation or not it fits in with clinical facts, and the writer has adopted it with success as a rational basis of treatment. Be the nature and cause of sprue what it may, a bacterial infection, a fermentation, or a mere physiological perversion, the explanation offered is justified, both scientifically and clinically. A change of diet, as of air, or of water, seems necessary to human welfare. In Britain we go for a change of air, in China it is said to be for a change of water that the invalid goes, and it is held by many that a "city" dinner is an excellent hygienic factor in the digestive economy. Change of "air" is not confined to man's requirements; animals, and more especially birds, find it necessary, although it may be for different reasons; and all animals in a natural state change their lairs or environment from time to time. The scientific explanation of this is probably based on hygienic factors, and would bear closer investigation with benefit. Sameness of diet is apt to lead to "staleness" of body and mind, a fact which it would be well also to probe more deeply. Advocacy of "fast days" from the stereotyped diet in sprue, therefore, is no heterodox innovation, but one which but fulfils natural and therefore normal bodily requirements.

Several sprue cases, by the advice of the writer, have returned to the Tropics and follow the fast day régime. One day in the week the usual diet of meat, vegetables, fruit, &c., is given up, and the patient takes nothing but milk for twenty-four hours. In this way several persons for whom life in a warm climate would have been otherwise impossible, are to-day enjoying good health. One usually allots Sunday as the milk day, but there is no reason why the "fast" day from meat should not be Friday, as it used to be with us, and is still in Catholic countries. Whichever day is chosen, however, is a matter of domestic convenience, but the omission, in cases of sprue, is apt to lead to recurrence of the ailment.

SEA-WATER FOR RECTAL INJECTIONS.

The writer finds that of all forms of lavage for the bowel sea-water is the best. In chronic dysentery, in mucous colitis, in ulcerative colitis and even in sprue injections of sea water—a couple of pints filtered, warmed, but not diluted—are highly beneficial. The injections may be given daily for three days, but afterwards every third day or once a week, until all mucous or fermentation is removed. The same good is not obtainable by "sea-salt" dissolved in water, although sea salt thus used is perhaps better than any other of the vegetable decoctions or mineral solutions in common use.

II. — SIGMOIDO-RECTAL STRICTURE — A SIGMOIDO-RECTAL PYLORUS—THE USE OF THE SIGMOIDOSCOPE.

The writer has during recent years made it a rule to examine the rectum of all cases of intestinal flux. To merely call it rectal examination is misleading, for, as a rule, the rectum by digital examination or by the ordinary rectal speculum will be found normal. The trouble in three-fourths of cases of chronic diarrhoea, dysentery, mucous colitis will be found at the junction of the sigmoid flexure and rectum six to eight inches up, that is, eight inches from the anus anatomically owing to rectal curves, but only six inches when straightened by the sigmoidoscope. At this point, there is naturally a narrowing of the bowel, even a pylorus with some of the functions of the gastro-duodenal pylorus. We are accustomed to think of the pylorus as if in some way the name meant an anatomical attribute of the stomach, but the word pylorus has no such signification. Pylorus is derived from the Greek words *πύλη* = gate and *οὐρος* = guard—a guard of the gate; the gate may be at the stomach, or sigmoid, or anywhere else. Therefore, to term the narrow junction of the sigmoid and rectum the sigmoido-rectal pylorus is no misnomer. The anatomy and physiology of this sigmoido-rectal pylorus, moreover, resembles in many ways the gastro-duodenal pylorus, a point which the writer will deal with more fully in the near future. It is no mere narrowing, but a true guard of the gateway from the sigmoid to the rectum. In chronic dysentery and in cases of colitis, this point will be found tender to palpation from the surface of the abdomen, at a point on the left side almost corresponding with McBurney's point on the right side in cases of appendicitis. Examination of the bowel at this point by the sigmoidoscope will elicit tenderness, at times exquisite; the mere touching of the point with a piece of cotton wool in a holder introduced through the sigmoidoscope will, as a rule, cause the cotton wool to be blood-stained, and the introduction of a long tube, say an œsophageal tube, through the bowel at this part introduced along the sigmoidoscope, will show that it is painful, that there is initial resistance to the tube of a spasmodic character, and that the tube is firmly grasped when it has been passed through and away up to the upper end of the sigmoid flexure or lower part of descending colon.

Stricture at this part is a common lesion in chronic rectal troubles, and without going into the matter further in the present paper, it is a condition which the writer has come to recognise and to deal with in the treatment of many forms of intestinal flux. The treatment consists of dilatation of the stricture, practised with the same intent as in cases of stricture of the urethra, and followed by as beneficial results in the rectal as in the urethral lesions. The nature of the stricture and the attendant clinical features of these two mucous tracts resemble each other closely, and their cure is effected by similar manipulations. To attempt to cure a sigmoido-rectal stricture by the introduction of a long tube without the sigmoidoscope, is to ensure failure. The sigmoidoscope must be introduced as far as possible, that is until mechanical

resistance and pain prevent its further introduction, and with the instrument held in position the œsophageal tube is passed along the tube of the instrument and held firmly against the sigmoido-rectal pylorus until the initial spasm is overcome, when it will slide up in the higher part of the bowel, with some pain, perhaps, but with the knowledge that the first step has been made in the cure of a rectal trouble which may have been of long duration and of a serious nature.

"Archiv. für Schiff- und Trop. Hyg.," vol. x., No. 2.

MALARIAL IMMUNITY.

Plehn, A., from clinical experience gained in Cameroon, concludes that personal immunity in a malarial district can only be relative and never complete. Old European residents in malarial countries seemingly attain an immunity, which is not a true immunity, but a mere tolerance which is not absolute. Any condition which tends to lower resistance, such as fatigue, sudden change in temperature, chills, accidents, or illness from any cause is apt to be attended by a suddenly increased virulence of the parasite or the toxins it produces. Malaria would seem to be latent in most, if not all, residents in malarial districts, and any departure from the even tenour of climate or the daily routine of life would seem to render the latent malaria active.

Natives of the Cameroon district who have never had febrile attacks, who have no enlargement of spleen, nor any signs of illness, may have malarial parasites in their blood; others, again, have enlarged spleens and some anemia, and yet are free from fever. Neither of these states, however, betoken immunity, for were these persons subjected to depressing influence such as confinement in prison, attacks of fever are almost certain to result. The relative immunity of many natives seems to be inborn, that is to say, the child acquired immunity during fetal life by being exposed to the endotoxins in the maternal blood: and after birth, although attacked by malarial parasites, which find their way into the blood through mosquito bites, yet is the child provided to some degree by the parasite poison present in its blood at birth.

Dr. Plehn is of opinion that Europeans arriving in a malarial district of the tropics can be also rendered relatively immune by the exhibition of quinine as a prophylactic. The quantity should be not less than seven grains, and the dose should be taken every fifth day, or if a large dose is preferred seven grains on consecutive days, either the fourth and fifth or the fifth and sixth. Quinine should be taken during the whole period of residence in a malarial district, and continued for at least six months after arrival in a non-malarial country.

When a large dose of quinine, say fifteen grains every fifth day, fails to prevent fever, the patient should be sent for change to a healthy (non-malarial) climate, and quinine administered every fifth day in seven grain doses for six months.

"Comptes Rendus de la Société de Biologie," November, 1905.

"Anopheles algeriensis et Myzomyia hispaniola convoient le paludisme." By Edmond and Etienne Sergent.

Messrs. Sergent have discovered the presence of sporozoite forms of the malarial parasite in the salivary glands of specimens of *Anopheles algeriensis* and *Myzomyia hispaniola*. These two mosquitoes have therefore to be added to the list of species capable of conveying malaria in Algeria; they are, however, both "wild," and are rarely found in dwelling-houses.—J. E. N.

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THE

Journal of Tropical Medicine

SEPTEMBER 15, 1906.

THE BRITISH MEDICAL ASSOCIATION MEETING AT TORONTO, CANADA, AUGUST 21 TO 24, 1906.

SOME 2,000 medical men attended the meeting of the British Medical Association, which was held in the buildings of the University of Toronto.

The meeting was a success in every way, the papers and discussion were scientifically valuable, the social arrangements were quite perfect, and the excursions to neighbouring and distant places of interest were carefully planned and conducted.

The retiring President, Mr. George Cooper Franklin, of Leicester, England, gave an account of the work of the Association during his year of office, and introduced the new President, Dr. R. A. Reeve, Dean of the University of Toronto. The Mayor of Toronto, Prof. J. H. Cameron, Prof. Alexander McPhedran and Dr. G. A. Bingham, delivered addresses of welcome on behalf of the city of Toronto, the local reception Committee, and of the Canadian and Ontario Medical Associations respectively.

The President, Dr. Reeve, after pointing out the cosmopolitan character of medical study, reviewed the early history and development of the British Medical Association, and referred to the advancement of medicine during the last ten years. Amongst the important subjects dealt with and advanced during

that period, he mentioned: (1) The new ideas brought forward in regard to the mechanical and chemical processes accompanying digestion, especially in the stomach; (2) the necessity for pure milk in the rearing of infants; (3) the researches in physiology by Sir Victor Horsley; (4) the discovery that pneumonia was a septic disease; (5) the introduction of "vaccine" for diphtheria and typhoid fever; (6) the discovery of a specific microbe in cerebrospinal meningitis; (7) the full recognition of the fact that yellow fever and malaria were carried by mosquitoes; (8) the extraordinary advances in preventive medicine.

The address in medicine was delivered by Sir James Barr, M.D., F.R.C.P. He chose for his subject "The Circulation Viewed from the Periphery."

Of the many interesting items in this erudite paper the following are noticeable: (1) As under normal circumstances a sufficient quantity of blood cannot get through the arterioles to keep the enormous capillary bed full, the lateral pressure and the velocity in the capillaries are ever-varying quantities; the pressure variations ranged from 50 to 2,000 mm. of water. (2) The variations of velocity of the blood in the capillaries amounted to from about 0.5 to 25 mm. per second. (3) The effects of gravity in the capillary pressure is an increase usually less than one-half of the hydrostatic effect, nor is the increase uniform, varying enormously in different individuals, and in the same individual under different conditions. (4) The viscosity of the blood is normally about five times that of distilled water, and in many diseases it amounts to nine or ten times that of distilled water. In Asiatic cholera the viscosity is often so great that it will not pass through the capillaries. A rise in temperature lessens the viscosity; the presence of carbonic acid gas in the blood is associated with diminished velocity and increases the viscosity, and Watson and Denning state that the chief resistance to the flow is due to the viscosity, and occurs in the capillaries. There seems, however, no doubt that the resistance to the arterial flow, and consequently to the heart, is situated in the first instance in the arteriole and small arteries and governed by vasomotor nerves. Were there not some such "first line of defence," the blood would gravitate into the more dependent parts, the cooling surface would be enormous, the capillary velocity would be diminished, the blood would become surcharged with carbonic acid gas, and we would become cold-blooded animals. By vasomotor mechanism a large amount of the cardiac energy is stored up in the arteries as potential, and is converted into kinetic energy in the arterioles and capillaries. Sir James Barr further discussed: The interchange of material through the capillary walls; the arterioles and capillaries of the skin; the arterioles and capillaries of the splanchnic area; the capillaries of the liver, the arterioles and capillaries of the kidneys and of the muscles; the cerebral vessels; the coronary vessels; the pulmonary circulation; the veins; the pressure in the veins; the velocity in the veins; the arteries, arterial blood pressure, and the heart.

Sir Victor Horsley, F.R.C.S., F.R.S., in his address in Surgery, dealt with "The Technique of Operations on the Nervous System." Surgical treatment of brain

affections are undertaken for palliative or curative purposes. As a palliative measure against optic neuritis, which is so common a symptom of intracranial disease, it would seem that blindness may be averted with something like certainty by opening the subdural space early, and preferably in the basal temporal region of the right side, assuming that no attempt is made to attack the disease itself. Curative surgical procedures depend (1) On the nature of the intracranial disease; (2) the loss or aberration of nerve function it causes; (3) whether if the lesion be wholly extirpated there will be a recovery from the disorder of function; (4) whether any loss which may have been present before operation will be made permanent by the necessary extirpation of particular regions of the brain.

On points like the last it is evident that we cannot give a satisfactory opinion until we know precisely, first, what parts of the central nervous system alone contain the representation of movements or the record of sensation, and consequently of what parts does destruction entail permanent loss of function. In other words, we require to learn from the cerebral physiologist under what circumstances and to what extent can we get *compensation* of function when various parts of the cerebrum and cerebellum are destroyed.

(1) *As regards the Cerebrum.*—Apparently from the clinical records we can generalise thus far, that special motor functions cannot be restored if the whole of their cortical representation be removed. The same thing is probably also true of the special senses, and certainly is true of the hemianopic representation of sight. Succinctly stated, this amounts to the generalisation that compensation is not possible after the destruction of middle level centres. The higher sensory representation and *a fortiori* the intellectual functions are, on the contrary, not permanently abrogated by the destruction of any one part of the cerebral hemisphere. The net conclusion, however, must be that as little injury as possible should be done, and no more removed than is absolutely necessary.

(2) *As regards the Cerebellum.*—This question of compensatory power is of notable scientific interest when studied in the cerebrum, which is so clearly an assemblage of different nerve centres (in fact we might almost say organs), but it is no less interesting in the study of a homogenous structure like the cerebellum, and has assumed a particular importance in the present subject because of Professor Frazier's proposal to extirpate the lateral lobe of the cerebellum in preference to pushing it aside by displacement for the purpose of reaching deep-seated tumours. My own experience is against such extirpations for convenience. In fact, I regard them as an unnecessary mutilation, though quite admitting that in the process of removing a large tumour in that region the cerebellum is considerably bruised when so pushed aside. I ought to add that although I have removed a considerable number of lateral recess cerebellar growths, I have never found it necessary to do more than compress the cerebellum aside.

Sir Victor Horsley then proceeded to describe "Con-

sideration of the Details of Operative Procedure," and referred to (a) Previous Preparation; (b) Anæsthesia; (c) Maintenance of the Body Temperature; (d) Hæmorrhage from arteries, arterioles and capillaries, and from veins. The address was illustrated by many excellent drawings.

The address in obstetrics was delivered by W. S. A. Griffith, M.D., F.R.C.P., F.R.C.S., who chose for his subject, "The Teaching of Obstetrics."

SECTION OF MEDICINE.

President: Sir THOMAS BARLOW, Bart.

Dr. Percy M. Dawson (Baltimore) opened a discussion on "Blood Pressure in Relation to Disease." He stated that the pulse pressure might be taken as an index of the systolic output of the heart.

Dr. G. A. Gibson (Edinburgh) dealt with "Clinical Methods of Investigating Blood Pressure." The various factors concerned in keeping up the blood pressure are: the initial pressure or energy of the heart, the peripheral resistance, especially that of the splanchnic area, the elasticity of the vessel, the amount of blood in circulation and the viscosity of the blood. Estimating blood pressure by so-called *tactus eruditus* was condemned, and could only be gauged by modern instruments of precision. Observations should always be made with the patient in the horizontal position, owing to the variations due to various positions; and the variability noticeable according to the time of day the observations were made, and the influence of food and occupation were also insisted upon.

Sir William H. Broadbent, Bart., (London) discussed "The Clinical and Therapeutical Indications of Morbid Blood Pressure," and stated that *tactus eruditus* was the ultimate means of investigation, and that the real place of the instrumental investigation was the education of the finger.

Professor T. Clifford Allbutt (Cambridge) read a paper on "The Relation of Blood Pressure to Arterial Sclerosis." Arterial sclerosis may be apportioned under three headings: (1) The toxic, in some of which it is increased, as in lead poisoning; in some diminished, as in syphilis; (2) Hyperpietic (prolonged high pressure), in which there is considerable arterial stress, the majority being subjects of granular kidney; (3) Involutionarily, met with in senile degradation, and associated with trophic or mechanical causes. These various groups of causes might be combined.

Dr. J. Mackenzie (Burnley), Dr. J. Lindsay Steven (Glasgow), Professor Alexander McPhedran (Toronto), and Dr. G. W. McCaskey joined in the discussion.

Dr. A. Stengel (Philadelphia) read a paper entitled "Some Clinical Manifestations, Visceral and general, of Arterio-sclerosis." He stated he had found continuous fever, lasting over considerable periods of time, in arterio-sclerosis without any local lesion to account for it, such as myelitis or other infection, and regarded the fever as possibly due to the active disorganisation of the tissues of the vessel wall, on the analogy of ferment fever.

Prof. Russell H. Chittenden (Yale) opened the discussion on "Over-nutrition and Under-nutrition, with Special Reference to Proteid Metabolism." Five men were fed for periods of from six to nine months on an

average daily metabolism of from 5.4 to 8.99 grammes of nitrogen, i.e., 34 to 56 grammes of proteid per day. In three cases, individuals of different weight, the amount of nitrogen required was 0.1 0.93 and 0.102 grammes respectively per kilogramme of body weight, amounted to not more than half of the Voit standard. Prof. Chittenden was of opinion that 0.1 gramme of proteid capable of metabolism per kilogramme represented the minimum proteid requirement, but it would probably be advisable to adopt a standard somewhat above this figure, and to give from 50 to 60 grammes of absorbable proteid to a man of from 60 to 70 kilogrammes weight, i.e., a reduction of about 50 per cent.

Prof. Halliburton (London) was of opinion that if we reduced the amount of proteid to the minimum necessary to subserve the repair of waste of the tissues we should be dangerously near the margin, and little would be left as a source of energy. Dr. Otto Folin (Mass) said, at present there were no data whereby to determine the amount of proteid necessary.

Dr. Robert Hutchison (London) remarked that it would be interesting to ascertain the opsonic index in persons taking a lessened nitrogenous diet, in regard to various diseases producing organisms, and the way in which such individuals passed through an acute illness.

Prof. L. Lapique (Paris), Dr. C. B. Ramarao (Madras), Sir James Grant (Ottawa), and Sir Thomas Barlow (London), took part in the discussion.

Dr. L. F. Barker (Baltimore) read a paper on "Amino-acids and Metabolism," the study of these acids present in foods showed that a human being took about the same quantity of these bodies, whether fish, white meats, or butcher's meat were taken, and the chemist was by synthesis now preparing from these a series of substances called peptides, viz., dipeptides, tripeptides, and polypeptides.

Dr. W. B. Thistle (Toronto) read a paper on "The Treatment of Typhoid Fever." Purgatives were suggested being given throughout the illness, so as to insure increased elimination of the typhoid organisms and their toxins. Calomel and salol were advocated as being at once purgative and antiseptic in the treatment of the disease. Dr. W. Caldwell (Belfast) said that the mortality of cases of typhoid fever which suffered from constipation during the course of the fever was less than those in cases in which diarrhœa was the rule, and therefore he avoided purgatives. Dr. F. McCrae (Baltimore) said that typhoid was a blood or general infection, not a local intestinal affection, and therefore he withheld purgatives as unscientific, and intestinal antiseptics as useless. Dr. W. H. Neilson (Wisconsin), Prof. McPhedran, Dr. Barker, and Dr. J. H. Hamilton (Ontario) also joined in the discussion.

Dr. F. J. Smith (London), in a paper entitled "The Treatment of Typhoid," favoured a more varied diet than the milk and beef tea treatment ordinarily followed. The dread of perforation from food was exaggerated; perforation and hæmorrhage in typhoid had other causes than dietary. Any digestible food that was neither hard nor sharp-edged might be given in place of milk, which favoured fermentation at times, and was apt to cause distention and tympanites. The height of the temperature did not

negative departure from the milk *regime*. In cases in which the patient was disinclined for food, water and fruit juice might be given freely.

Dr. McCallum (Ontario) pointed out that it was difficult to state what a solid diet meant, for what was solid in the mouth might be fluid in the intestine, and *vice versa*.

Dr. R. Hutchinson (London) believed that to the lactic acid contained in it was probably due the beneficial action of milk; the question of diet, therefore, was not altogether a mechanical one.

Dr. McCaskey regarded milk as an unsafe diet in typhoid, considering the large masses of casein one found in the intestine in consequence of taking milk.

Sir Thomas Barlow remarked on the craving for food many typhoid patients developed, and it was a question whether it was always wise to deny them a suitably varied diet. Scraped beef or meat or fish passed through a sieve, were often well tolerated in typhoid, and seemed to cause no special intestinal trouble.

Dr. D. G. Spiller (Philadelphia) described a case of syringomyelia, reaching from the sacral region of the cord upwards along the medulla oblongata, the right side of the pons, the right cerebral peduncle, and as far as the right internal capsule (syringobulbia).

In reply to Dr. C. Meyers, Dr. Spiller stated that he believed the sensation of pain (which was present in this case) was conducted by Gowers' tract, and not by the lateral columns.

Dr. S. Flexner (New York) read a paper on "The Serum Treatment of Cerebro-spinal Meningitis," in which he stated that he had succeeded in isolating an organism showing constant features, to which was assigned the name *Diplococcus intracellularis*. Against this he had prepared an antitoxin, made from monkeys, and 1 c.cm. of this substance injected into the spinal canal of a monkey which had previously received a lethal dose of the organism, prevented death. The signs and symptoms of the disease could be produced in monkeys by repeated doses of the toxin. Dr. L. Steven (Glasgow) said an outbreak of cerebro-spinal meningitis prevailed in Glasgow in March, 1906, and it was now included among the notifiable infectious diseases. Dr. MacFarlane (Albany) believed the best form of treatment in cerebro-spinal meningitis to be repeated tapping of the spinal canal. He was of opinion that the disease gained access to human beings by way of the pharynx. Seeing that it was impossible to inject fluid into the spinal canal in sufficient quantity to find its way to the cerebral cavity, the limitation of experimental meningitis to the spinal canal was probably explained. Dr. J. J. Putnam (Boston) compared "certain modern philosophic doctrines with regard to their relationship to the therapeutics of psychasthenia."

Dr. G. Doch (Ann Arbor) dealt with "Paracentesis of the Pericardium," stating that the operation was always attended by danger, be the precautions what they may. Posture seemed to have to do with the success of the operation, as, by altering the posture could fluid be drawn off. The angle between the xiphoid cartilage and the seventh left costal cartilage seemed the spot best suited for tapping the peri-

cardium. Dr. T. B. McConnell (Montreal) mentioned a case of accumulation of fluid in the pericardium, successfully treated by tapping, and subsequent incision and drainage. Sir Thomas Barlow stated that he favoured incision in preference to aspiration in pericardial effusion, and said that fluid and fibrin collected behind the heart.

Dr. H. A. McCallum (London, Ontario) introduced the subject of Gastric Neurasthenia, which was discussed by Drs. Putnam, McPhedran, Walsh and Caldwell.

Dr. Campbell Myers (Toronto) advocated spinal treatment for cases of acute mental disease during the preinsane stage. In this contention he was supported by Dr. Putnam (Boston).

SURGERY.

President; Sir HECTOR CAMERON.

Mr. Sinclair White (Sheffield) opened the discussion on "The Surgical Treatment of Ascites Secondary to Vascular Cirrhosis of the Liver." He proceeded to show the advantage of this operation, and stated that absolute proof has been obtained that epiploxy leads, in suitable cases, to a remarkable development of anastomosing vessels between omentum and liver.

Mr. G. Guy Turner (Newcastle-on-Tyne) took part in the discussion.

Mr. John Lynn Thomas (Cardiff) read a paper on "Enucleation of the Prostate." He stated that enucleation of the prostate should be undertaken as soon as the patient was compelled to face the risks of "catheter life." He stated that there were no pronounced advantages of the suprapubic over the perineal method of enucleation so far as the incidence of mortality was concerned, but that the suprapubic operation showed slight advantage in regard to more complete removal of the organ. In the discussion which followed, a decided preference was shown, on the part of American surgeons, for the perineal route.

Dr. G. E. Armstrong (Montreal) reported a case of "Successful Removal of the Spleen in a Case of Banti's Disease."

Dr. Dow (Regina, Sark) showed a case of plastic surgery of the hip joint (arthroplasty), which had been successfully performed by introducing a layer of fascia and fat between the end of the divided femur.

Dr. Ingersoll Olmsted (Hamilton, Canada) in a paper on "The Surgical Treatment of Ulcerative Colitis," referred to the advantages of appendicostomy and irrigation of the intestine through a catheter, introduced into the appendix, after the manner originated and practised by Dr. Weir, of New York.

In a discussion on "The Surgical Treatment of Duodenal Ulcer," Dr. W. J. Mayo (Rochester, Minn.) recommended gastrojejunostomy as the most advantageous operation in chronic cases. In acute cases with perforation, transverse suture of the ulcerated and perforated area with pelvic drainage is indicated, with gastrojejunostomy subsequently. The results of this operation are eminently successful; of 175 reported cases of chronic duodenal ulcer operated on, two deaths only occurred; of ten cases operated upon for acute

perforation, four died; and of three cases operated upon for repeated hæmorrhage one died.

Mr. G. C. Franklin (Leicester) joined in the discussion, and mentioned that when a duodenal ulcer perforated the signs and symptoms were intense agonising pain in the upper part of abdomen, with locally rigid muscles.

Dr. B. E. McKenzie (Toronto) stated that in "The Treatment of Congenital Club-Foot," tenotomy and simple mechanical appliances were preferable to the more heroic measures in fashion. The tenotomy ought to be performed not earlier than the twelfth month of infant life.

Mr. Harold Stiles (Edinburgh) stated that he practised tarsotomy extensively in cases of club-foot, and claimed that by this means better and more speedy results were attainable than by tenotomy and mechanical appliances.

Prof. W. G. McCallum (Baltimore) in a paper entitled "The Surgical Relations of the Parathyroid Glands," stated that the acute tetany which occasionally followed removal of the thyroid gland, was owing to the fact that the parathyroid bodies were removed at the same time. The bodies referred to were met with, as a rule, along the course of the inferior thyroid arteries, but their number and position varied. That their removal was apt to cause tetany had been proved in both animals and man, and their preservation ought to be looked to during the steps of the operation for removal of the thyroid, when possible. Sir Victor Horsley discussed the paper.

Mr. C. J. Bond (Leicester) read a paper on "The Treatment of Acute Septic Peritonitis," in which he stated: (1) It is most important to avoid all unnecessary injury to the endothelium. (2) The diaphragmatic portion of the peritoneum is of great importance in the absorption of fluids and in phagocytosis. (3) Phagocytosis and the protection afforded by the endothelial cells lining the peritoneum constituted the first line of defence in injuries and diseases of the abdominal cavity. (4) Destruction of the cells opens the way for infection to be diffused by vascular or lymph channels. (5) Perforation of gastric or duodenal ulcers, followed by extravasation of the visceral contents into the peritoneal cavity was not followed by a virulent infection, and if early operation was practised curative results might be confidently anticipated. (6) Irrigation should be freely practised after laparotomy when gastric or duodenal contents, fæces, pus, bile or urine were found in the peritoneal cavity. (7) Irrigation should be withheld when the exudation into the peritoneal cavity was of a (a) sticky fibrinous nature; (b) when phagocytosis was likely to be disturbed; (c) and when the flushing of the cavity was likely to cause diffusion of the infective material. (8) In cases of gangrene of the intestine, and in local abscesses free drainage is a necessity. Dr. W. Howitt (Guelph), Dr. Murphy (Chicago), Dr. W. J. Mayo (Rochester) and others, joined in the discussion.

Mr. Jenkins (London) read a paper on "The Causation of Congenital Dislocation of the Hip." He ascribed the condition to be due to arrest in the bony development of the superior portion of the acetabulum.

Mr. G. G. Turner (Newcastle-on-Tyne) read a com-

munication on "Intestinal Obstruction in Association with the Vermiform Appendix."

Dr. Parkins (Toronto) showed a case of multiple tumours in both breasts of a female patient.

Mr. C. H. Whiteford (Plymouth) showed a method of retaining a rubber catheter after external urethrotomy by means of what he termed a perineal stop.

A SIMPLE PREVENTIVE AGAINST MALARIA.

A CIRCULAR, published in English, Singalese and Tamil, is being circulated by the Ceylon Agricultural Society in Ceylon, drawing attention to the use of a composite oil for anointing the body to prevent mosquito bites. The suggestion is made by E. E. Green, F.E.S., and M. Kelway Bamber, F.C.S.

The constituents of the fluid suggested are citronella, kerosine, and cocoanut oils, with a certain proportion of carbolic acid. As an alternative for cocoanut oil, vaseline can be employed, but is more expensive.

Citronella oil alone is too dear for general use, and its effect is evanescent. Kerosine oil is similarly fugitive, and has the additional objection of an unpleasant smell.

It was found by experiment that a mixture of the above ingredients in certain proportions completely disguised the objectionable odours of kerosine and cocoanut oils, and produced a limpid liquid, smelling only of citronella, with a far more lasting effect. The mixture of the more inexpensive oils so reduces the cost that it can be freely employed on a large scale, and such a mixture could be easily produced locally on a commercial scale at a reasonable cost. The great difficulty with coolies is to induce them to take any precautions; but we know that they are always ready to anoint themselves either with cocoanut oil or with citronella if they can get it; but the latter is generally beyond their means.

All employers of labour in feverish localities should insist upon their coolies taking the simple precautions here suggested.

Every evening, at dusk, small quantities of the mixture should be rubbed over the legs and arms, and any other exposed parts, including the face; the oil is quite free from any harmful or unpleasant effect on skin.

Report.

THE HEALTH OF THE BRITISH NAVY— REPORT FOR THE YEAR 1904.

THE recently issued statistical report of the health of the Navy for the year 1904 extends to 197 pages.

The invaliding ratio of the total force amounted to 22.7 per 1,000, a decrease of 7.28 in comparison with the average for the last seven years.

The death-rate was 4.45 per 1,000, a decrease of 1.01 per 1,000 on the average of seven years.

The death-rate from disease alone was 3.14 per 1,000.

GENERAL DISEASES AND NUMBER OF CASES.

H. = Home; E.I. = East Indies; M. = Mediterranean; S.A. = South Atlantic; C. = China; N.A. = North America; I.F. = Irregular Force; A. = Australia; P. = Pacific; C.G.H. = Cape of Good Hope.

	Cases	Deaths	Stations
Small-pox	12	0	H. 1; E.I. 2; C. 9
Cow-pox	248	0	
Chicken-pox	29	0	H. 11; S.A. 10
Measles	118	0	H. 93; E.I. 8; C. 3; M. 2; I.F. 12
Rubella	47	0	H. 30; E.I. 1; N.A. 7; M. 7; I.F. 2
Scarlet Fever	179	4	H. 169; N.A. 3; I.F. 2
Dengue	26	0	C. 25; N.A. 1
Typhus Fever	1	—	C. 1
Influenza	1,586	1	H. 1,083; M. 311; S.A. 16; N.A. 11; P. 4; C. 37; A. 31; I.F. 93
Mumps	143	0	H. 53; C. 27; A. 48
Diphtheria	29	1	H. 23; M. 5; I.F. 1
Plague	1	—	E.I. 1
Cerebro-Spinal Fever	2	2	H. 1; C. 1
Simple Continued Fever	1,035	0	H. 54; E.I. 310; N.A. 11; S.A. 14; P. 5; M. 401; A. 3; C.G.H. 27; I.F. 84
Enteric Fever	276	39	H. 51; E.I. 6; N.A. 25; P. 3; M. 61; C. 49; C.G.H. 5; I.F. 17
Mediterranean Fever	430	9	H. 59; E.I. 1; N.A. 1; M. 333; C. 12; C.G.H. 1; I.F. 22
Dysentery	113	9	H. 10; E.I. 40; S.A. 4; P. 3; M. 16; C.G.H. 1; C. 36; I.F. 23
Yellow Fever	1	1	I.F. (Jamaica) 1
Malarial Fevers	693	5	H. 167; E.I. 122; N.A. 27; S.A. 115; P. 3; M. 45; C.G.H. 62; C. 105; I.F. 29
Septic Diseases	34	12	
Tubercle	456	64	H. 272; E.I. 1; N.A. 9; S.A. 8; P. 4; M. 75; C.G.H. 10; C. 39; H. 17; I.F. 21
Venereal Diseases	12,258	10	
Rheumatism	2,361	1	
Gout	150	—	
Malignant Growths	9	8	
Non-malignant Growths	153	—	
Diabetes	8	2	
Beri-beri	4	0	E.I. 3; C.G.H. 1

THE PROPORTIONS OF SICKNESS AND DEATHS IN THE SEVERAL STATIONS.

Station	Strength	Sickness per 1,000	Deaths per 1,000
Home	59,470	721.37	4.27
Mediterranean	19,590	686.57	4.38
North America and West Indies	2,910	914.77	3.78
South Atlantic	1,780	990.44	3.37
Pacific	1,290	704.65	3.87
Cape of Good Hope	2,270	904.4	5.28
East Indies	1,930	1,222.79	10.36
China	10,180	779.56	4.91
Australia	2,970	794.94	7.07
Irregular Force	8,180	862.22	3.42

The following papers appear in the report:—

I.—SOME FURTHER POINTS IN THE ETIOLOGY OF MEDITERRANEAN FEVER, WITH PARTICULAR REFERENCE TO THE GROWTH OF THE SPECIFIC ORGANISM OUTSIDE THE BODY.

By Fleet-Surgeon P. W. BASSETT-SMITH, R.N.

Royal Naval Hospital, Haslar.

Major Horrocks, R.A.M.C., proved conclusively that the *Micrococcus melitensis* escapes by means of the urine from patients suffering from the disease. The urine thus containing the m.m. might then convey the disease by fresh or sea water, clothing or soil.

A few observations on similar lines were carried out and incorporated in the Report on the Etiology of Mediterranean Fever in the Health of the Navy, 1901, but the organism employed was derived from artificially infected human urine, or had grown for some period in urine, which did not appear in any way to reduce its vitality.

The most noticeable facts were that in even moderately alkaline urine the growth seemed to thrive for a time, not dying out until it gave a very considerable alkalinity (in one, that of standard decinormal soda solution), and that the larger the quantity of urine in the test tube infected, the longer the growth retained its vitality, and, of course, the grosser the original infection the more abundant the growth.

Fleet-Surgeon Bassett Smith by a series of experiments investigated the viability of the *M. melitensis* in sterilised urine, in sea water, in tap water, in fabric which had been infected and slowly dried, and in artificially infected dust.

The results of vitality of the m.m. outside the body shows that the m.m. can retain its vitality for a long period:—

- (1) In urine which has become markedly alkaline.
- (2) In fabrics which have become contaminated by urine containing the m.m.
- (3) In sea and tap water infected by urine.
- (4) In soil that has been infected by urine, and that has dried naturally.

From the experiments one may gather that in any endemic region where the sanitation is bad, it is easy for the dispersion of the organism and possible infection of the healthy to take place, quite apart from any agency of insects as secondary hosts.

II.—FURTHER NOTES ON THE DISTRIBUTION OF MEDITERRANEAN FEVER IN THE FLEET, WITH REFERENCE TO ITS ETIOLOGY.

By Fleet-Surgeon P. W. BASSETT-SMITH, R.N.

Haslar Hospital.

"In continuation of the statistical reports of the occurrence of Mediterranean fever, made in the years 1901, 1902, and 1903, I have again for 1904 made an abstract of the results from the special forms which have been filled in, details of which are given below. The total number of cases thus furnished is 260, as against 302 for 1903."

"Of these 260 cases 19 were relapses, giving a total of 241 fresh ones; some instances of the fever which occurred on the station have undoubtedly not been

included, none of these, probably, having been admitted into the Malta hospital."

"The diagnosis was confirmed in every case by the "serum reaction" test, either at Malta by Staff-Surgeon Gilmour, or by myself at Haslar."

"The observations of this year tend more conclusively than before to indicate that though sporadic cases of Mediterranean Fever do probably occur at other ports of the Mediterranean, by far the most prolific centre of infection is Malta itself."

III.—ON THE AGGLUTINATION REACTION IN MEDITERRANEAN FEVER.

By Staff-Surgeon E. A. SHAW, R.N.

Time of its Appearance.—Agglutination reaction is manifest in blood taken from cases quite early in the disease, viz., from two to five days.

Amount of Dilution in which it is Obtainable.—In a dilution of 1 in 2, the blood of healthy people and of patients suffering from other diseases will nearly always give it, and a large proportion of them will show traces of it in a dilution of 1 in 10.

Duration of Agglutinating Power after Appearance.—

Birt and Lamb found it in all cases examined up to two years after the attack. After two years it was, in 8 out of 14 cases examined, no more marked than in people who had not had this fever; they record one case in which, seven and a-half years after recovery, there was still a complete reaction in a 1 in 20 dilution.

The phenomenon of agglutination in Mediterranean Fever is, as a rule, very marked and unmistakeable. The appearance of little white clumps, aggregations of micrococci, in the mixed drop of the specific serum and emulsion is frequently visible to the naked eye, especially on comparison with the control, and for the mere determination of the presence of agglutination in a 1 in 30 dilution, often a good pocket lens is sufficient after a certain amount of experience has been gained. It is advisable, however, especially at first, to commence with the low power of the microscope, the $\frac{3}{8}$ -inch objective, arranging a feeble illumination; if a strong illumination be used, the micrococci, which, it must be remembered are not stained, will be practically invisible in the glare. Without disturbing the relative positions of the Abbé condenser and the plane mirror as used with the $\frac{1}{2}$ -inch objective, the desired reduction of illumination can be obtained by racking down the two from near the stage till the upper surface of the Abbé condenser is very nearly an inch away from the upper surface of the stage on which the slide rests. Then, first wiping off all moisture from the under surface of the slide, and examining first the control—this, if properly made, will be found to present a very fine, faintly granular, appearance, without any indication of clumps then proceeding to the lowest dilution of specific (Malta fever) serum and micrococci, the latter, if agglutination has taken place, will be found aggregated into big clumps, or into a fine network spreading throughout the drop, usually both appearances will be present in the drop; then the higher dilutions should be examined, and the highest one in which agglutination has taken place, noted. No cover slips are necessary

for the examination with the $\frac{3}{8}$ -inch objective, but if, at the end of a couple of hours, no sign of agglutination can be detected with the $\frac{3}{8}$ -inch objective, a small cover slip should be placed on the control and on the lowest dilution, and comparison made with the $\frac{1}{2}$ -inch objective; this will necessitate the approaching of the Abbé condenser to within about $\frac{1}{4}$ -inch of the surface of the stage, more light being required with the higher power, but, as before, a feeble illumination is best. If now no trace of agglutination can be detected, the result of the examination should be recorded as negative. It is highly desirable that, for the purpose of comparing the results obtained by different observers, some common standard should be agreed to. As regards density of emulsion used, this ideal is very difficult of attainment, but as regards length of time allowed for agglutination to appear and power of microscope used, there should be no difficulty. In the last hundred cases I have examined, I have invariably found agglutination, if present, to manifest itself in less than one hour, and to be visible under the $\frac{3}{8}$ -inch objective. This reaction is much more marked and definite than the corresponding one in typhoid fever.

IV.—NOTES ON THE TREATMENT AND SYMPTOMS OF MEDITERRANEAN FEVER.

By Fleet-Surgeon D. J. McNABB, R.N.

Forty-two cases are brought under notice and discussed in these notes.

In the general management of these cases it was found that they assimilated ordinary solid food with benefit to themselves, irrespective of high temperature.

Numerous drugs were tried without any appreciable result, the only one appearing to be of benefit being cyllin.

This drug is a preparation of the Jeyes' Sanitary Compounds Company, and appears to be a coal tar derivative.

The preparation used was pure cyllin in palatinoids, each palatinoid containing 3 minims of the drug.

The course of treatment by cyllin was inaugurated by a purgative such as calomel, and the drug was given at the rate of two palatinoids thrice daily.

It is non-poisonous, and its administration was followed by no unpleasant results.

Of the 42 cases under consideration 10 had neither pyrexia nor symptoms. These were dismissed from the list, and the remaining 32 dealt with.

These 32 cases are divided into 24 which were not treated with cyllin, and 8 cases in which the drug was tried.

The average duration of the cases not treated worked out at 70.6 days, while that of the cases where the drug was used was 38.5 days.

V.—THE YEAR'S WORK AT THE LABORATORY, ROYAL NAVAL HOSPITAL, MALTA, FOR 1904.

By Staff-Surgeon R. T. GILMOUR, R.N.

The Agglutination Test in Mediterranean Fever and Enteric.—Eighteen hundred and ninety-eight specimens of blood were tested for these diseases. The reaction is of great aid to diagnosis, but not infallible.

The agglutination reaction may be present as early as the first day of the disease in Mediterranean fever; can usually be obtained in the first week; but may be delayed indefinitely. Cases with the symptoms of this fever are met with which never react.

The reaction rarely appears before the middle of the second week in enteric; in this disease also it may be delayed, or never present.

The following deductions may be drawn:—

(1) At the commencement of convalescence there is usually a considerable drop in the reaction.

(2) In cases which relapse the agglutination test remains high.

(3) The reaction usually intermits before its final disappearance.

(4) Cases may have a negative reaction for several months, then react again.

(5) Cases may react up to eighteen months.

(6) Cases may only react for a few months.

(7) The agglutination reaction usually ceases during the second year of convalescence.

VI.—COMPRESSED AIR ILLNESS AND ITS TREATMENT BY THE INHALATION OF OXYGEN.

By Fleet-Surgeon EDWARD PAIN MOURILYAN, M.B., R.N.

The symptoms with which workers in compressed air, men employed in caissons and divers, are affected vary much in severity, and may be divided into two groups:—

(1) Those due to mechanical pressure, such as pains in ears, frontal and maxillary sinuses, and in carious teeth, headache, rupture of membrana tympani. These supervene on exit from compressed air and usually subside in a short time.

(2) Those, much graver, which are due to the actual presence of gas in the blood-vessels and to gas-embolism—i.e., pains in limbs (the so-called "Bends") and joints, headache and vertigo, and other cerebral symptoms, deafness, dyspnoea, circulatory disturbances and paralysis. The paralyzes do not supervene directly upon exit from pressure, but occur after a latent period of varying duration.

Oxygen is an important remedy in the prophylaxis and treatment of gas-embolism. By its use—its inhalation under stationary pressure—decompression can be rendered innocuous.

Symptoms of illness having set in, it promotes the separation of the gas in the right heart and assists the circulation. Combined with recompression, its therapeutical action is effected in the highest degree.

VII.—"CAISSON" DISEASE (DIVER'S PALSY.)

By Fleet-Surgeon J. L. BARRINGTON, R.N.

Royal Naval Hospital, Haulbowline.

Remarks.—The explanation of the condition in Caisson disease, like many other diseases of the nervous system, is still very obscure, and though the interest of the disease is centred in its pathology, the most that can be said for the various theories brought forward is that they are very indefinite and inconclusive. In one case reported by Leydens, death taking place on the fifteenth day, foci of hæmorrhages

and signs of acute myelitis were found in the thoracic cord. In a case of Schultze, death occurring in two and a-half months, a disseminated myelitis was found in the thoracic region. In these cases slight fissures and lacerations were also found, as also in a third fatal case examined on the third day. One theory put forward is that the effects are due to liberated bubbles of nitrogen which have been absorbed into the blood during the high pressure. A second is that the symptoms are due to the pressure driving the blood from the surface into the great vertebral area of veins, followed by a revulsive anæmia, which, if true, would explain the temporary nature of the lesion in a case recorded by Fleet-Surgeon Barrington. In a second case, recorded by the same observer, the rise of temperature and temporary leucocytosis rather points, on the other hand, to a secondary inflammatory condition, the suddenness of the symptoms excluding inflammation as a primary cause. The paralysis was purely motor; there was no alteration in the sensation of touch, pain, heat or cold; the only sensory phenomena were shooting pains in the extremities. Now, since the sensory tract lies more towards the centre of the cord, and seeing that the reflex arcs were intact, one might hazard that minute sparsely scattered hæmorrhages in some of the motor tracts were the explanation of the symptoms.

VIII.—NOTES OF A CASE OF SPLENIC ANÆMIA.

By Staff-Surgeon OSWALD REES, M.D., R.N.

Shortly, the symptoms of this rare disease are:—Insidious onset and a fatal termination. In the blood, diminished hæmoglobin, a moderate erythrocyte anæmia (3,000,000 to 4,000,000), deformities of shape and polychromatophilia in severe and late cases, rare erythroblasts, marked leucopenic anæmia—(1,500-4,000), constituent leucocytes not much altered, but myelocytes in advanced stages—the spleen enormously enlarged, whilst the other lymphatics are not involved—pressure symptoms due to the enlarged spleen, dyspnoea, palpitation, dyspepsia, hæmatemesis, and epistaxis.

As regards the position of this disease in the official "Nomenclature of Disease," it would seem to fall most naturally between idiopathic anæmia and leucæmia.

IX.—NINGPO VARNISH DISEASE.

By Staff-Surgeon P. HAMILTON BOYDEN, M.D., R.N.

This disease is an affection of the skin, chiefly of those parts exposed to the air, of an erythematous or eczematous character, caused by contact with or from sitting in a confined space recently painted with Ningpo varnish.

There are two kinds of varnishes:—

(1) Fat or oil varnishes.

(2) Spirit varnishes.

Their manufacture requires much skill and knowledge of the proper mixing of the ingredients, and in knowing how long they should be kept to mature before use.

In an oil varnish, to which variety Ningpo varnish

belongs, linseed oil is generally used as a vehicle; but in Ningpo varnish wood oil obtained from the Tung tree, growing plentifully in Mid-China, is made use of. The first process in the manufacture is to take a quantity of copal, which is a gum exuding spontaneously from the stems of various trees belonging to the genera, *Hymenda*, *Guibourtia*, and *Trachylobium*, found growing in the East and West Indies, and other parts of the world. The copal is melted in a pot, with a quantity of boiled linseed oil, by the aid of heat, until the mixture is perfectly clear; more oil is added in small quantities, and the mixture further boiled until it becomes stringy. The pot is then taken off the fire, and when cooled down sufficiently turpentine is gradually added, stirring all the while until the whole is thoroughly mixed; it is then strained and put aside until ready for use.

A quantity of Ningpo varnish was analysed and found to contain fat, an oleo-resin, a variety of copal, and a volatile acid, which were separated in the following manner:—The varnish was first of all treated with hot absolute alcohol, and so extracted the fat; the residue was treated with ether, which extracted the oleo-resin, leaving behind the very insoluble copal.

The volatile acid distilled over with the oleo-resin, and was separated by shaking up with water and evaporating the ether. The acid was in very small quantity, colourless, and had an irritating effect upon the unbroken skin.

The question now came to be as to the source of the oleo-resin and the irritative volatile acid, and one's thoughts naturally turned to the order, *Anacardiaceæ*, to which the genus *Rhus* belongs.

Rhus toxicodendron is a well-known irritant vesicant, and has a place in the United States Pharmacopœia.

In parts of China and Japan, *Rhus vernicifera* flourishes, and is used in Japan for making the celebrated lacquer.

I have found this tree growing plentifully in the higher parts of the Yang-tze valley, and think there is very little doubt that the oleo-resin from this tree is the basis of Ningpo varnish.

The varnish tree is a small, dicocious tree, 10 to 15 feet high, with smooth branches and leaves, the latter being pinnate, and consisting of from 11 to 15 shiny green leaflets, from 2 to 3 inches long, and of an oblong form, with a long taper point. The fruit consists of racemes of small round berries, from the seeds of which Japan wax is expressed.

The manner of collecting the resin is as follows:—Incisions are made in the stem, and are repeated every fourth day at successively higher parts of the tree.

The inspissated juice is scraped off with a flat iron tool, and when the tree has been thus tapped to the topmost branches it is felled. The log is cut into lengths, which are tied into faggots and steeped in water for two or three weeks, after which the bark is pierced, and the oozing resin collected in the same way as from the stem. The juice thus obtained is a tenacious fluid of a greyish brown colour. It is allowed to stand and settle, when a kind of skin forms on the surface, the better quality rising to the top, and the impurities falling to the bottom. This fluid is highly

corrosive, causing vesication and even ulceration of the skin, without actual contact, although it should be noted that, as in the case of other vegetable poisons—e.g., *primula obconica*, also indigenous in China—many people are quite insusceptible to its action. As a rule, women and children are the greatest sufferers. In my own person, I have tried inhalation and also painting the varnish on the thin skin of the forearm, without any irritative effect being produced.

The volatile acid mentioned above has been investigated by several Japanese scientists. It is named "Urushic acid," derived from "Urushu," the Japanese word for the lacquer tree. This acid under the action of a ferment (a nitrogenous body), which is present in the fresh juice, rapidly becomes converted into oxy-urushic acid, of which I made mention before when noting the darkening in colour on exposure to the air.

A peculiar feature in reference to the application of the varnish is that it is always put on in damp weather, as it sets much better, and gets a harder and smoother surface.

The symptoms of varnish poisoning rival those imputed to the upas tree (*Antiaris*) of Java. The hands, arms, face, and in some cases the whole body, become greatly swollen from simply carrying a branch of the tree, or handling the varnish, the swelling being accompanied by intolerable pain and inflammation, and sometimes ending in ulceration. The treatment consists in the repeated application of a solution of *plumbi acetat*, which seems to have an almost specific effect in subduing the inflammation. The distribution of the disease is no doubt a very limited one, but I think it is of some importance for Medical Officers of His Majesty's Fleet to recognise that such an affection, which may at times assume a severe type, exists.

The varnish, being such an excellent one, is largely used by merchant ships trading in the Far East, and it is quite within the bounds of probability that commanding officers might make use of it, for varnishing the woodwork of His Majesty's ships, without knowledge of its dangerous properties; and if such cases did occur, a medical officer might be much exercised as to the cause of the outbreak if he were not acquainted with the symptoms of the disease.

X.—CASES RESEMBLING A CASE OF DERMATITIS REPENS.

By Fleet-Surgeon P. B. HANDYSIDE, R.N.

XI.—THE RADICAL CURE OF INGUINAL HERNIA.

By Fleet-Surgeon VIDAL G. THORPE, R.N.

Correspondence.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIR,—In reference to Dr. Hamilton Wright's article in your issue of August 15th, entitled, "Beri-beri: A Restatement and Reply to Some Criticisms," I beg to state that I do not consider I have misunderstood

his working hypothesis of the disease. My impression was that his "acute beri-beri" included the whole period marked "d" in his graphic illustration, namely, that during which the poison was formed, and a slight further period during which this poison continued to act, the whole corresponding to "g" in his diagram.

The lesions in the stomach and duodenum I found in thirteen out of thirty-four cases up to August, 1904, and in other cases in 1904 and 1905, but though common they cannot be said to have been "pretty constant." These lesions were found in persons dead in various stages of the disease, but in others they were absent both in early stages and in late stages. The nature of superficial lesions of the gastric mucosa is always difficult to determine, and when, as in beri-beri, there are also present nerve and vascular changes due to nerve poisoning, these difficulties are much increased. On macroscopic and microscopic examination I found nothing incompatible with the hypothesis that these changes were themselves secondary.

At no time have I "enunciated the pathological conception that this lesion cannot be primary." I did consider that it was necessary to test Wright's hypothesis by showing whether the condition was primary on other than histological grounds, and I therefore paid particular attention to the period assumed by Wright to exist, namely, that during which a gastro-duodenitis existed and no nerve lesions had developed—the period marked "c" in his diagram. Dr. Wright gives no instances of his own observation in support of his view. He gives histories which at most show that the patients complained of epigastric distress before they noticed any symptoms referable to nerve changes. Histories from natives and through native interpreters are not sufficient verification.

It was to this period "c," the only one in which the evidence could be conclusive, that most of my enquiries were directed, and I fully recognised that it was not the whole of the period during which Dr. Wright considered that the poison was being formed. In my own observations I did not find any cases in which the symptoms described by Wright were present without evidence of co-existent nerve lesions.

My use of the term "neuritis" is allowed by Dr. Wright as an alternative for "residual paralysis" in the Table of Contents and on page 1 of the "Studies of the Institute of Medical Research," vol. ii., Part II.

The subject is an important one, and it is well to clear up misunderstandings. Dr. Wright thinks I should have included clinical histories in my observations, but I venture to suggest that it would have been better if he had placed less reliance on such histories. With many of Dr. Wright's views I am in complete accord, and I recognise fully the admirable work he has done towards the clear enunciation of the problems presented by this disease, but I failed to find any satisfactory confirmation of the primary nature of the lesions he describes.

Yours, &c.,
C. W. DANIELS

New Instruments.

EVANS AND WORMULL, 31, Stamford Street, S.E., Surgical Instrument Makers, have sent us a copy of their comprehensive catalogue, which is well worth the perusal of any medical man who is about to make any purchases.

WE understand that Mr. Henry Gowlland, optician, of Selsey, Chichester, has perfected a new $\frac{1}{2}$ in. object glass, oil immersion, which he guarantees to be entirely of British manufacture, but what is of more importance to our readers, is that no soft glass is used in the objective, and that it will stand any climate. The objective is beautifully finished, and the price is only 55s., which compares very favourably with the objectives of foreign manufacture of the same power, which are retailed in this country at £5 and upwards. Intending purchasers would do well to write for further particulars before purchasing elsewhere.

Notes and News.

THE Report in the *United Provinces Gazette* of Major Chaytor White, I.M.S., as Chief Plague Officer of the United Provinces for 1905, is replete with practical interest. During the year 1905, plague existed in more or less epidemic form throughout the provinces. In many districts it was very severe, particularly in Muttra, where 45,644 deaths were registered, almost all occurring in the earlier months of the year under review. Only one district returned no seizures or deaths, viz., Almora. The total number of seizures reported in 1905 were 334,679, while the deaths totalled 305,737. It will be observed from the following figures that the deaths have progressively doubled in each of the last three years: (1903), 80,729; (1904), 166,620; (1905), 305,737. In the first five months of the year the mortality was most serious, but a marked change for the better has occurred during the plague season of 1905-6, so that there is hope that the disease is slowly dying out. The mortality for the first six months of the year was 300,039, while only 5,698 deaths occurred from July 1, to December 31. The disease has been uniformly more severe in rural areas.

Every inducement is offered to the people to evacuate infected sites, but they have not availed themselves of the facilities of the "health camps" established by Government to the extent that might be desired, and on this account reliance has still to be placed on disinfection. Disinfection by acid perchloride of mercury is still carried out. Izal, which was under trial in 1904, has not proved itself more efficacious than acid perchloride of mercury, moreover, the extra cost is against its use. Since December "cyllin" is being tried under the orders of the Government, and from the reports since received on its efficacy it is expected that it will prove a more effective disinfectant than the acid perchloride of mercury. The

same objection is present that is urged by natives against the use of phenyl—its smell—to which they strongly object. Phenyl is also used to a considerable extent.

Six thousand four hundred and eleven inoculations were performed throughout the provinces during the year 1905. Of these in Bareilly alone there were performed 5,194, against 3,010 in the previous year; this heads the list for inoculations in the provinces.

Phenyl, though a comparatively weak bactericide, it must be noted is a much better insecticide than the other agents mentioned, and it is probably owing to this that it has so often been found useful, to an extent that was inexplicable before the rat-flea hypothesis was accepted.

The details as to the results of rat-killing are most instructive, and it is satisfactory to find that it has been found possible to carry out this procedure without exciting undue opposition. This year rat killing was carried out on a large scale throughout the provinces. Only seven districts viz., Almora, Dehra Dun, Garhwal Saharanpur, Etah, Farrukhabad, and Mainpuri did no rat-killing. In Dehra Dun one rat only was killed. In all 851,167 rats were killed in 41 out of 48 districts.

Bareilly heads the lists in the year under report, and in it alone were killed 215,106 in five months. Allahabad comes next to Bareilly, and killed 77,345, Badaun and Agra killed 66,241 and 57,711 rats respectively, and ran third and fourth in the provinces. Badaun is only a small town of 39,031 inhabitants, but Mr. U. P. Allen, the collector, undertook the experiment of killing wholesale the rats in the town. This he did most effectively, letting out the work to contractors. The sum of Rs. 2,750 was spent on this work in Badaun, and not a single case of plague has occurred since the work was begun last monsoon up to now (March, 1906). Mr. Campbell, Collector of Bareilly, was also most energetic, and destroyed more rats than any other district officer. Out of the Rs. 100,000 at the disposal of the Inspector-General of Civil Hospitals, a sum of Rs. 24,850 was allotted for rat killing and general plague preventive measures. It may be mentioned that the above figures practically only refer to the last four or five months of the year, so that the efforts of the district officers were very real. From the plague returns, which have been received up to and during March, 1906 (usually the worst month in the year), it appears that the measures adopted have done much good in reducing the mortality, and the people undoubtedly believe that the measures adopted against rats have effected this. "Wonder" rat traps were used in almost all the municipalities and are much better than any other kind. They were distributed free to the public. Rewards are given to catchers for each rat caught, at different rates—generally two pice a rat and one pice a mouse. The rat poison called "Common Sense" is used by some municipalities and is well reported upon, no accident having occurred by its use. Opinions were obtained from the heads of the Medical Departments of various provinces as to the efficacy of the "Common Sense Poison" and all agreed that this poison is by far the best. Danyz' virus was tried in many places, but the results were not satisfactory.

Special tubes were got out from England and distributed, but the opinion generally expressed was adverse. It is rather depressing, however, to find that Major Chaytor White considers that in villages rat-killing to a practical extent is almost impossible.

LORD KITCHENER wants the Army to have its jam without the Gregory's powder. In a speech at the first meeting of the Standing Committee on enteric fever, his lordship suggested that the labours of the members should be directed to making antityphoid inoculation less unpleasant to the subject of the operation, even if the period of immunity were thereby curtailed.

The speech gives evidence of personal study of the question, but whether obtained through the action of spontaneous disease, or by the artificial process of inoculation, it is to be feared that immunity can only be gained at the cost of more or less personal discomfort.

THE INDIAN PLAGUE returns for the week ending July 28th show 562 deaths, a considerable drop as compared with the previous week's figures, after allowing for belated returns which swelled that week's total. Nearly half the mortality, viz., 262 deaths, occurred in Bombay. Madras reports only 6, and Bengal only 15; the United Provinces, 16; the Punjab, 11; Eastern Bengal, 4; Central Provinces, 1; Central India, 2; and Mysore, 37. Burma runs Bombay close with 208 deaths.

The total number of plague cases in Rangoon, however, for July, has been the heaviest since the outbreak of the epidemic in February, 1906. There were during the month 706 cases and 650 deaths.

THE INDIAN COMMITTEE ON ENTERIC.—On conclusion of the Commander-in-Chief's address, the Enteric Committee proceeded with their deliberations. They have since carefully considered the question of enteric fever with reference to its prevalence amongst various classes of individuals and communities in India. Statistics and evidence from the Army Medical Reports, the Annual Reports of the Sanitary Commissioner and others from the year 1856 were placed before them. The various sources of infection—excreta, fabrics, food, drink, &c., were discussed, and lines of present prophylaxis and a campaign for future prevention laid down. In the matter of cantonment sanitation the Committee had the advantage of the presence of the Inspecting Officer of cantonments (Lieutenant-Colonel Thornhill), whose views on this matter were of great assistance. The subject of antityphoid inoculation was fully dealt with. It is hoped the decisions arrived at and the line of action laid down will have marked beneficial results, not only on the health of the Army, but also to the community at large. The Committee, after four full days' sitting, have adjourned till the middle of October, when reports on the practical working of the various resolutions will be examined, and the recommendations, if necessary, added to.—*Pioneer Mail*, August 10th.

A good deal of disappointment is felt in Rangoon at the action of the Special Committee on Waterworks

in accepting the "Hlawga Scheme" in its present form. Instead of 40 gallons per head for a population of 650,000, at a total cost of about a quarter of a million sterling, the work actually accomplished can provide only 25 gallons per head for 207,000, and has cost over a third more than that sum; while, to provide for a population of 340,000 would cost twice as much as the original estimate, for nearly double the population. It is satisfactory, however, to find that all shades of public opinion appear to agree that a good and sufficient water supply is an absolute necessity to the town.

WE reproduce from the August number of *The Indian Medical Gazette*, a letter to its Editor from Dr. E. S. Goodhue, which is of interest to all students of tropical medicine:—

THE BACILLUS LEPRÆ IN THE GNAT AND BED-BUG.

To the Editor of *The Indian Medical Gazette*.

DEAR SIR.—You will be glad to learn that Dr. W. J. Goodhue, Medical Superintendent of the Leper Settlement at Molokai, after several years of investigation there, has been able to demonstrate the *B. lepræ* of Hansen in the mosquito and in the bed-bug.

I will quote from Dr. Goodhue's official (but as yet private) report to the Hawaiian Board of Health:—

"February 10th, 1906: We have since . . . been sectioning mosquitoes taken from various leper houses, but until last June without any apparent success. At that time it appeared that we had isolated bacilli in these series of experiments, but, owing to the technique employed, it was impossible to confirm this . . . This method of research was abandoned. . . . After repeated failures and the constant re-examination of fresh specimens, success has come as far as demonstrating the *B. lepræ* in the female mosquito (*Culex pungens*). . . ."

"February 20th 1906: Since writing you I have discovered the bacillus of Hansen in the bed-bug (*Cimex lectularia*). . . . I believe that the *Cimex* is more of a factor in the spread of leprosy among the natives than the gnat" (here follow reasons).

Full reports of the work, with microphotographs of slides, &c., will be given publicly in May. You will kindly keep the matter confidential until May 8th, when you will be free to use it. We should be glad to have your Journal containing notices of the discovery.

Yours very truly,

Hawaii,

April 9th, 1906.

E. S. GOODHUE,

Government Physician.

That the agency of parasites should explain the mystery of the method of transmission of leprosy becomes increasingly probable, as parallel cases continue to be proven in etiology of other diseases. Our knowledge of the facility of accidental and intentional inoculation in the case of many diseases, makes it almost inconceivable that biting parasites should not, at least occasionally, act as inoculators; but in the case of leprosy, the failure of all attempts to produce direct infection makes it probable that some special parasite must be concerned, within which the virulence of the bacillus, as found in the human tissues, is enhanced.

In an Editorial our contemporary ably discusses Mr. Jonathan Hutchinson's recent book on "Leprosy and Fish-Eating." That the fish causation theory should be rejected by anyone with an extended acquaintance of Indian facts relating to leprosy is a

foregone conclusion, as it is impossible to practice long in the country without meeting with lepers who, it is morally certain, would die at the stake rather than touch fish in any form, whether salted or fresh, newly caught, or in any stage of decomposition. In India, as elsewhere, leprosy is specially a disease of the verminous poor, but it is certainly no respecter of caste; though the peculiar dietetic limitations that are imposed by the caste system, and the rigidity with which they are carried out, should make India the best of all fields for the investigation of any food causation theory. Many castes will not touch fish, while others consume it largely; and the fact that leprosy is not practically confined to, or even specially common in the latter, is a sufficient demonstration that the theory in question is no better than an improbable fad.

On the other hand, the writer evidently considers that the last has not been heard of Capt. Rost's scarcity of salt theory, as he concludes his remarks with the following paragraph:—

We have no intention of bringing forward, without proof, a salt hypothesis, as opposed to a fish hypothesis, and as being the last word on the leprosy question. It is, of course, as readers of *The Indian Medical Gazette* are aware, not a new one, and we hope shortly to be able to test it in certain directions which we believe have never been attempted—a matter which is of some interest, as we understand that it is quite impossible to consider the Kasauli tests as final.

Personal Notes.

INDIAN MEDICAL SERVICES.

Arrivals Reported in London.—Major B. C. Oldham, Major H. St. J. Fraser.

Extensions of Leave.—Captain H. Hugo, D.S.O., furlough to December 12th, 1906; Major J. Chaytor White, 6 w., medical certificate; Major J. K. Close, study leave, May 1st to July 31st, 1906; Captain E. L. Perry, study leave, February 1st to March 31st, and May 1st to June 26th, 1906; Lieutenant-Colonel W. B. Browning, C.I.E., 1 m. 14 d., medical certificate; Major A. R. O. Russell, 6 m., medical certificate; Captain A. E. J. Lister, 1 m., medical certificate; Lieutenant J. W. H. Babington, 14 d.

Permitted to Return to Duty.—Major H. E. Drake-Brockman, Lieutenant J. W. H. Babington, Major L. F. Childe, Captain J. B. Christian, Captain R. L. Hagger, Captain R. D. Willcocks, Lieutenant-Colonel W. Coates, Major S. H. Henderson, Lieutenant-Colonel H. Fooks, Captain A. B. Fry.

Retirements.

Lieutenant-Colonel D. Prain and Lieutenant-Colonel Mawson are permitted to retire.

Promotion.

Captain Ross Pearce, M.B., to be Major.

Postings.

Captains F. A. Barnado and L. Cook, services lent to Government of Bengal.

Captains H. B. Steen, O. Moses and H. A. J. Gidney, services lent to the Government, East Bengal and Assam.

Captain W. S. Patton, services temporarily lent to Government, Madras; and of Captain Stewart and Lieutenant Proctor, for service on a Drainage Committee.

Captain M. Dick acts as Health Officer, Rangoon.

Lieutenant-Colonel J. Carmichael, R.A.M.C., to the Command of the Station Hospital, Jullundur.

Captain D. S. A. O'Keefe, to Medical Charge, 26th Punjabis.

Captain R. G. Easton, to Medical Charge, 22nd Punjabis.
 Captain N. W. Jeendine, to Medical Charge, 27th Punjabis.
 Captain T. C. McC. Young, to Medical Charge, 34th Sikh
 Pioneers.

Captain E. A. Walker, to Medical Charge, 36th Sikhs.

Captain J. Woods, to Medical Charge, 53rd Sikhs.

The undermentioned officers of the Indian Medical Service are appointed specialists in the subjects noted:—Fever: Major Wimberley, 3rd (Lahore) Division. Prevention of Disease: Lieutenants Proctor, Umballa, and Ingram Aden. Captain Keys is appointed specialist in Midwifery and Diseases of Women and Children in the Western Command.

The undermentioned officers of the Royal Army Medical Corps are permitted to continue in their appointments of specialists in the subjects noted:—Fever: Major Clark, 1st (Peshawar) Division; Captain Huddleston, 5th (Mhow) Division; and Captain Hopkins, 6th (Poona) Division. Skiagraphy: Major Boyle, Burma Division; and Captain Greech, 7th (Meerut) Division. Dentistry: Lieutenant Bowle, 5th (Mhow) Division. Ophthalmology: Major McDermott, Eastern Command; and Captain Kiddle, Western Command.

The undermentioned officers of the Royal Army Medical Corps, on return from leave, are appointed specialists in the subjects noted:—Operative Surgery: Major Cameron, 3rd (Lahore) Division. Midwifery and Diseases of Women and Children: Captain Maurice, Eastern Command. Laryngology: Captain Proffit, Northern Command. Otology: Captain Berne, Western Command.

Military Assistant-Surgeon C. A. Owen, M.D., I.S.M.D., officiates as Civil Surgeon, Shahpur.

Captain J. Stephenson, to be Civil Surgeon, Umballa.

Captain C. A. Lane, to be Civil Surgeon, Purnea.

Major Brend, to be Inspector-General, Prisons, Punjab, in succession to Major Macnamara, who is transferred to Madras, in the same capacity.

Captain W. C. H. Forster is placed on special duty under the Sanitary Commissioner with Government of India.

Major O'Kinealy acts as Professor of Ophthalmic Surgery, Calcutta.

Captain S. L. Marjoribanks, to be Deputy Sanitary Commissioner, Western Registration District.

Captain F. H. G. Hutchinson, to be Deputy Sanitary Commissioner, Southern Registration District.

Captain R. W. Antony, to be Civil Surgeon, Ratnagiri.

Major L. Rogers, Major D. M. Moir and Dr. Annandale are appointed Fellows of the Calcutta University.

Captain E. Bisset assumes charge of civil medical duties of the Kohat District.

Lieutenant W. Tarr assumes Civil Medical Charge of Sheikh Budin.

Captain W. H. Cazaly, to be Civil Surgeon, Satara.

Captain A. G. Sargent, to be Civil Surgeon, Panch Mahals.

Leave.

Major B. Oldham, combined leave, 15 m.

Major Maynard, Professor of Ophthalmology, Calcutta, privilege leave, 3 m.

Captain W. C. Ross, Deputy Sanitary Commissioner, Oussa Carch, privilege leave, 2 m, 23 d.

Captain C. J. Robertson Milne, services replaced at disposal, Government of Bengal.

Captain W. S. J. Shaw, services temporarily lent to Government of Punjab.

Captain C. A. Gourlay, services placed permanently at disposal, Government, East Bengal and Assam, in Sanitary Department.

Captain F. Wall, 62nd Punjabis, to additional civil charge of Fyzabad District.

COLONIAL CIVIL SERVICE.

Dr. A. Morrison has retired from the office of Government Botanist of Western Australia.

The Hon. Dr. F. Watts, C.M.G., Government Chemist and Superintendent of Agriculture, Leeward Island, has left the Colony on leave for four months, during which Mr. H. Tempany will perform his duties.

PLAGUE.

PREVALENCE OF THE DISEASE.

		Cases.	Deaths.
India.—Week ended	August 4th	—	738
"	" 11th	—	936
Mauritius	" 8th	1	1
"	" 15th	3	2
"	" 22nd	6	4
"	" 29th	13	13
"	September 6th	3	2
Hong Kong.—Week ended	Aug. 19th	3	2

Clean Bills of Health issued for Hong Kong on August 29th.

Australia.—During the week ended July 21st, 1 case of plague at Cairns, Queensland. No other cases of plague reported from July 7th to August 4th in any part of Australia.

South Africa.—No cases of plague from July 7th to August 18th.

THE SLEEPING SICKNESS.

KING LEOPOLD AND THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

IN view of the alarming nature of the recent reports with regard to the spread of sleeping sickness in Africa, and of the fact that an expedition organised by the Liverpool School of Tropical Medicine has been studying this disease for three years in the Congo, Sir Alfred Jones, president of the school, requested an audience of the King of the Belgians in order to confer with him upon the subject. In a recent letter to the secretaries of the reform committee King Leopold referred to his deep interest in this matter, and, besides offering a prize of 200,000f. (£8,000) for the person who should discover a remedy, he has placed a credit of 300,000f. (£12,000) in the Congo estimates for the purpose of prophylactic research.

The committee of the School were received at the Palace, on August 23rd, at noon. The representatives present included the president, Sir Alfred Jones, Professor Ronald Ross, C.B., F.R.S., Professor Boyce, F.R.S., Dr. J. W. W. Stephens, Dr. J. L. Todd, Mr. R. Newstead, Dr. Evans, and Mr. A. H. Milne. The King gave a most attentive hearing to the views of the experts of the school on the necessity of preventing the further spread of sleeping sickness. He agreed with Sir A. Jones that the question was one of international importance, and said that, as far as he was concerned, he was prepared to do all in his power to relieve both the white and black population from the terrible dread of this scourge. His Majesty asked the Liverpool School to submit to him a scheme for the prevention of the disease, and this request will be acted upon as soon as possible. He has promised his co-operation if it is in any way feasible or practical. The King expressed in high terms his appreciation of the energetic work now being carried on by the school and of the thorough manner in which its expeditions are worked. In conclusion, to show the value he placed upon that work, he bestowed the Order of

Leopold upon Professor Ross, Professor Boyce, and Dr. J. L. Todd, the last-named of whom worked on trypanosomiasis in the Congo Free State for three years.

The conference was followed by a luncheon at the Palace to the representatives of the Liverpool School. Among those present were Baron Wahis, Governor-General of the Congo, Commandant Liebrechts, Secretary-General of the Home Department, and other leading representatives of the Brussels Administration.—*Times*, August 24th, 1906.

UNIVERSITY OF CAMBRIDGE.

DIPLOMA OF TROPICAL MEDICINE AND HYGIENE. D.T.M. AND H. (CAMB.)

The following candidates qualified for the Diploma during the year, 1906:—February, 1906—J. Booth-Clarkson, J. C. S. McDowell, R. Small; August, 1906—Samuel Anderson, Robert Thomas Booth, Charles Walter Holden, Thomas Campion Lauder, Harry Strickland McGill, Edward McKillop Nicholl, Ambrose Thomas Stanton, Lessel Philip Stephen, Edmund Wilkinson, Andrew Watson Cook Young.

Examiners { George H. F. Nuttall.
 { Ronald Ross.
 { C. W. Daniels.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Proceedings of the Royal Society," vol. lxxviii., No. B. 522.

"The Microscopic Changes in the Nervous System in a case of Chronic Dourine. Comparison with those found in Sleeping Sickness."

Mott, F. W., M.D., F.R.S., states the result of an investigation in the nervous tissues of an Arab stallion which acquired Dourine or *mal de coit*, by infective coitus. The tissues were forwarded by Dr. Lingard of the Imperial Bacteriologist Laboratory of India. The result of the investigation demonstrated that in Dourine, in animals inoculated with *Trypanosoma gambiense* and in human sleeping sickness, chronic trypanosome infection sets up a lymphadenitis and a chronic inflammation of the lymphatics of the central nervous system. As the result of these inflammatory states, a chronic interstitial condition of the lymphatics of the soft membranes, the subpial septa and the perivascular spaces, without any pronounced destruction of the neural elements. Of this chronic interstitial change the cell proliferation of the neuroglia is the primary evidence; and it is surmised, from the knowledge attained by observing chronic trypanosomiasis in animals, that the lymphocyte accumulation and proliferation is of a secondary character and in part the result of the changes referred to in the neuroglia.

In view of the fact that Dourine is caused by a specific form of trypanosome conveyed during coitus in the horse, Schaudinn's demonstration of the spirochaete pallida in syphilis is daily acquiring increased significance and interest. Dourine may be shortly described in the light of recent knowledge as "Horse Syphilis."

"Indian Medical Gazette," June, 1906.

(1) SPLENIC ABSCESS IN MALARIAL FEVER.

Anderson, A. R. S., Major I. M. S., describes two cases of splenic abscess in Hindu male prisoners in Port Blair Gaol, Andaman Islands. In both cases there had been a long previous history of malarial fever and enlarged spleen. In one case no malarial parasites were found, probably owing to quinine administration; in the other case malignant tertian parasites were found. A slough was found in one case; in the other no ponderable slough, but a quantity of broken-down splenic tissue. Of 77,949 patients suffering from malarial fever, seen by Major Anderson during the past five years, these are the only two cases in which splenic abscesses were diagnosed. In three other spleens, out of a total of 178 fatal cases reported upon, splenic abscesses, or the condition possibly precedent to such abscesses, were found. In one spleen were several hemorrhagic infarcts; in a second numerous miliary abscesses; and in the third several small abscesses.

Of the two cases operated upon by Major Anderson, one recovered and was well five years afterwards, the other survived the operation nine months, subsequently dying from pyæmia.

(2) "CYSTICERCUS CELLULOSE OF TONGUE, WITH A NOTE ON THE HELMINTHOLOGY OF ONE OF THE MADRAS JAILS."

Williams, C. L., Major, I.M.S., found a cystic swelling about the size of a hazel nut in the under-surface of the left side of the tip of the tongue of a convict in the jail at Coimbatore, Madras Presidency, India. From the swelling when cut down upon, the head of a *Tenia Solium* was enucleated. The district of Coimbatore seems to be in distinct contrast to the reported prevalent infection of the alimentary canal of the natives of India generally, for, as a rule, the natives of Coimbatore are wonderfully free from "worms."

"Ann. de l'Inst. Pasteur," May, 1906.

ANTIDYSENTERIC SERUM.

Vaillard and Dopter found that the serum from horses which have been immunised against the dysentery bacillus is applicable and useful in dysentery in man. The prepared horse serum has anti-bacterial and anti-toxic properties, and when injected in doses proportionate to the severity of the dysenteric attack remedial effects speedily result. The injection should be given early in the disease, but even as late as the sixteenth day in acute dysentery the treatment is efficient.

"Riv. Crit. di Clin. Med.," 1906.

SPLENOCLEISIS.

Schiassi, B., in a case of enlarged spleen and marked anaemia, cut down on the spleen, scraped the surface with a sharp spoon, enveloped the spleen in five layers of gauze and sewed the wound up, leaving, however, the ends of the strips of gauze protruding from the upper and lower ends of the wound. The strips were removed one by one from the fifth to the ninth day after operation. The patient did well, the blood count rose in six months (that is from before until after operation) from $3\frac{1}{2}$ to $5\frac{1}{2}$ million red cells, haemoglobin from 24 per cent. to 92, and white cells from 1,600 to 6,200. In true splenic anaemia the only signs and symptoms are enlargement of the spleen and anaemia, both of which tend to increase. The success of this operation is encouraging.

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

NILE BOILS.

By FRANK COLE MADDEN, M.D.Melb., F.R.C.S.Eng.

*Professor of Surgery, Egyptian Government School of Medicine;
Senior Surgeon, Kasr-el Ainy Hospital, Cairo.*

DURING the hot months, and particularly in the damp weather towards the end of the summer, and also at the changes of season, residents of Egypt frequently suffer from a peculiarly painful boil (or boils), which has so many distinctive features as to justify a more detailed description than has hitherto, so far as I am aware, been devoted to it.

The European residents are probably more often attacked than the native Egyptians, though the latter are not by any means exempt. In their case, however, the condition about to be described is included with many other pustular lesions, due to the heat and excessive sweating, in the all-embracing title of "Hamm en-Nil," which, to the native mind, is sufficiently comprehensive to connote any skin eruption from a prickly heat to a general furunculosis. Though thus almost lost sight of among its many distant relatives, true Nile boil does occasionally occur.

A form of boil, the so called "Bouton de Nil," next of kin to the Delhi boil, the Aleppo boil, and the Biskra button, as described by Manson, Briault, and other observers, is essentially a chronic process, and in my eight years' experience in Egypt I have never met with such a condition, either in hospital or private practice. The boil we are accustomed to call the Nile boil is an acute inflammatory and exceedingly painful condition, which does not last more than fourteen days from beginning to end.

As has already been mentioned, the boil is particularly frequent at the end of the summer, when the Nile is rising or is in flood, and the weather is very damp, and also in the early spring, that is to say, at the end of the cold season. In certain cases it occurs when the patient is much "run down," or after one of the infectious fevers, but is just as frequently met with when he is in the rudest health. Food, drink, or water do not seem to influence its occurrence, and no *régime* or diet appears to prevent it. One is liable to have attacks of boils at long intervals, sometimes every summer, or to have a series of boils one after the other, which persist for a long time. The boils also have an unfortunate habit of developing in particularly tender places, some of their favourite seats being the perinæum, especially all round the anus, the buttocks, the arms, the hands and the fingers, and the face. They are not so common on the neck or on the lower extremities below the buttocks, though they are to be found on any part of the skin surface, and even within the external auditory meatus. They are more common in men than in women, but are no respecters of age or sex, though, fortunately, they do not often occur in young children.

Having been myself the subject of Nile boils on no less than four occasions, I can speak with some authority on the matter, and cannot do better than describe my feelings in detail, reinforcing my own

personal reminiscences with certain additional facts I have observed in other fellow-sufferers.

On accidentally rubbing my forearm with my cuff, I felt a distinctly painful point which, on close examination, I found to be a minute red spot at the base of a hair, in the hair follicle. In a few hours' time the redness was more evident and the spot was slightly raised around the base of the hair; the tenderness, even at this stage, was altogether out of all proportion to the naked eye appearances, the least friction of the shirt sleeves being quite painful. During the night I was conscious of a transient throbbing in the spot and found myself taking unusual care to place the arm in a comfortable position.

In the morning there was a red swelling the size of a sixpence, not unlike an ordinary blind boil, which was very painful, throbbed horribly, and was acutely tender to the least touch. The skin around the hair was dusky and was surrounded by a zone of dark red inflammation, fading off to a hyperæmic redness beyond. The central portion of the swollen lump was very hard and indurated, the indurated piece feeling as though it were let into the deeper parts of the skin. By mid-day the lump had increased in size and was even more tender than before. The surrounding inflammation had also increased in proportion. Thin, tender, red lines of inflamed lymphatics could now be seen, and there was pain above the elbow and in the axilla. A tiny blister had formed in the centre of the boil and this burst on extracting the hair and exposed beneath it the top of a pea-green-coloured slough, which was firmly attached all round to the surrounding inflamed tissues. The colour and the characters of this slough is very typical and its appearance confirms the diagnosis.

From this time onwards the swelling generally increased until it reached the size of the palm of the hand, and it exhibited all degrees of acute inflammation with the green chamois-leather-like slough in the centre. The hard induration was now the size of a florin and the whole of the inflamed area was oedematous and pitted on pressure. The point of acutest pain was immediately around the slough.

On the fourth day a drop of thick pus was squeezed out from beside the now much enlarged slough, but without any relief whatever. The slough was still firm all round, except just at the skin surface, and gave me the idea of being screwed into the bone in the depths of the boil. The lymphangitis and the pain in the axilla increased and the lymphatic glands were enlarged and tender. The arm was absolutely useless, felt as heavy as lead, throbbed violently on any sudden movement, and could not find a comfortable place for itself anywhere.

On the fifth day, by dint of hot fomentations, the slough, which was now more yellow in colour, looked looser, and a vigorous squeeze caused the greater part of it to pop out. It looked like a partially macerated bean, and was coated with thick pus. The remains of the slough still holding on tight to the depths of the boil, had to be picked out with dissecting forceps, and a small quantity of thick, slimy-looking pus was finally squeezed out. There was then left a crater-like cavity with sharply cut though rather eaten-out edges, in the midst of a still much inflamed and indurated area of

skin; but from the moment of the loosening and subsequent removal of the slough, the pain vanished as if by magic, and the part, though still hard and inflamed, was quite painless and could be handled and squeezed with impunity. Indeed, save for the redness and the crater it was difficult to believe that a short time before one was in such severe pain.

The next morning the cavity had filled in a great deal and a little sero-pus could be squeezed out; by evening it had nearly all filled with granulation tissue and was coated with a thin layer of coagulated serum.

In two days' time the sore had quite healed, the redness had markedly diminished, and a small hard lump was all that remained of the induration. A permanent scar, covered thinly with skin, remains, or a small mass of keloid forms in the scar. Throughout the whole period, up to the time of the expulsion of the slough, a very small quantity of serous discharge was found on the dressings. I have had two boils in adjoining follicles, which, starting on different days, made the whole course of the disease longer; but, though there is a larger scar from the fusion of the two craters, the symptoms were substantially as just described. Infection of neighbouring follicles naturally frequently results. When crops of boils occur, as is sometimes the case in the perineum, on the loins or on the face, during the time of their acuteness, the local as well as the general symptoms may be so severe as to give rise to some anxiety. I felt perfectly well in myself when the boils broke out, but by the third day I felt distinctly "seedy," with all the usual accompaniments of fever, including a general malaise, loss of appetite, headache, sleeplessness, &c. In some cases when a large number of boils develop one after the other, the constitutional symptoms may be severe.

Professor Symmers made a culture directly from the slough, on the third day of the disease, and grew a pure culture of *Staphylococcus pyogenes aureus*. In severe cases a spreading cellulitis may supervene, or, more usually, an abscess form just beyond the limits of the boil, and, rarely, all the more serious septic consequences may ensue.

Treatment is most unsatisfactory. In the very early stage an attempt, which it must be admitted is very rarely successful, may be made to abort the boil by extracting the hair and injecting a drop or two of pure carbolic into the reddened follicle.

Once the boil has got beyond the initial stage the hair should be extracted and hot sublimate or lysol fomentations, or antiseptic linseed poultices, applied and changed as often as possible. These hot applications in my experience are the only measures that afford any relief. Each time they are changed the part should be soaked in water, as hot as can be borne, for ten minutes before the fomentation is re-applied.

It is not the least use trying to squeeze out the slough until it is loose. It will not come out and the squeezing only increases the pain and the throbbing. Sometimes it comes out of itself on the fomentations on the fifth day. Even after its removal the fomentations are best continued for another twelve hours, after which the part may be dressed with vaseline or boracic ointment. Splints and other appliances to im-

mobilise the inflamed parts must be used as necessary, and all complications treated as they arise.

Little is usually required in the way of general treatment, except an efficient aperient in the earlier stages, a low diet, and rest. I have tried calcium sulphide, sulphur, sulphate of magnesia, and many other drugs without any good result, nor have I seen any effect from yeast in any form.

Once a boil has developed it is a good plan to pull out the surrounding hairs to prevent infection, but I know of no remedy of any service as a prophylactic.

I would, with all respect, venture to affirm that the condition, hitherto described as the Nile boil, or "Bouton de Nil," does not now exist in Egypt; but there is a particular form of boil peculiar to the country, characterised by the intensity of its inflammation, its extraordinary and early tenderness and pain, out of all proportion to its naked eye appearances, its characteristic slough and very scanty serous discharge, its rounded button of hard induration, and its resistance to treatment, until it has run its own course, which is a distinct pathological entity and a worthy successor to the title so long borne by its better-known predecessor.

THREE CASES OF INFECTION WITH *SCHISTOSOMA JAPONICUM* IN CHINESE SUBJECTS.

By O. T. LOGAN, M.D.

Medical Missionary, Changteh, Hunan, China.

I AM led to contribute this paper for three reasons: (1) To help define the geographical distribution of the fluke. (2) To give an idea of the form of the egg and embryo as it is seen in the stool. It seems very unfortunate that none of the current numbers of this Journal nor the latest, and one might safely say the only, book in English on the subject of animal parasites in man, should have failed to give drawings of the ova or embryo that would enable one to recognise the presence of this fluke. (3) To show the effect of treatment.

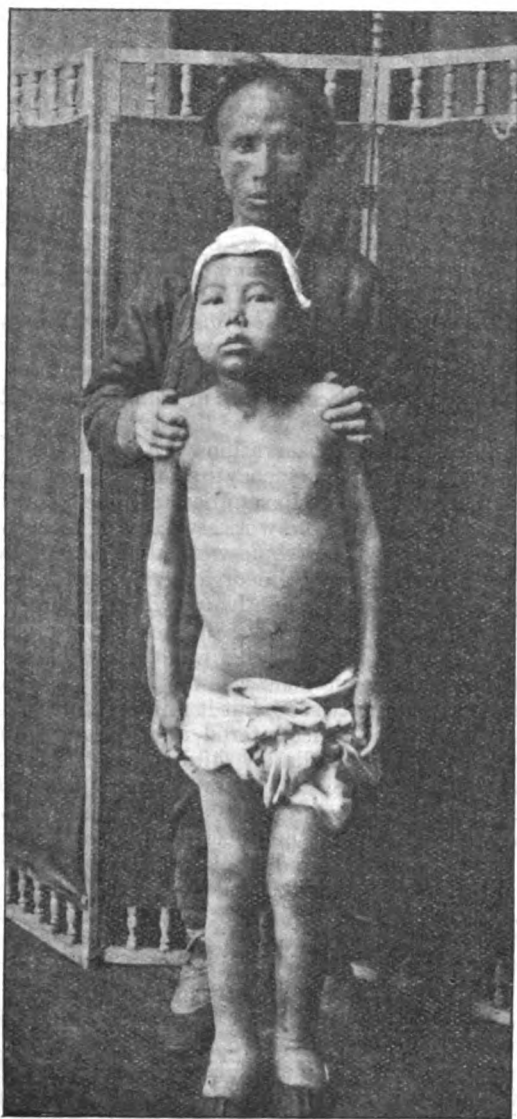
Our first case has been reported in full, at my request, by Dr. Beyer,¹ who, with Drs. Stiles and Lovering, identified and measured the eggs in the specimen of faecal matter sent by the writer. They found the average measurement of nine eggs to be 72 microns in length and 48 microns in width. Thus it will be seen that the egg is only a little larger than that of the *Ascaris lumbricoides*—a very important matter for the novice in faecal examination to note.

Our second case is especially instructive in that it shows the good effects of treatment, and offers hope that some of these patients may outlive the parasite and eventually be cured. The notes on this case are as follows:—

Tsen, male, aged 13. Born and reared in Hunan Province; Changteh Prefecture. Occupation, farmer. It should be stated that one of the duties of farmers,

¹ "A Second Case of Infection with the Asiatic Blood Fluke (*Schistosoma Japonicum*)," by H. G. Beyer, Medical Inspector, United States Navy. *American Medicine*, vol. x., No. 14, pp. 578-579, September 30th, 1905.

in this district at least, is to fish in the ponds that are always near the houses of the farmers. This means that there must be a good deal of wading, as the small seine is one of the commonest implements used in catching fish in these ponds, the banks of which are always strewn with snail shells, the former occupants of which, no doubt, are the intermediate host of the parasite. Patient also admitted that he often drank this water without boiling.



Schistosoma japonicum infection.

The boy gave a history of swelling of the legs and face about two years previous to admission to the hospital, and found that he could not do any considerable amount of work without great inconvenience on account of shortness of breath. Along with this he had bloody stools. At the time of admission he had, on an average, six of these stools in twenty-four hours, accompanied by prolapse of the rectum of some one

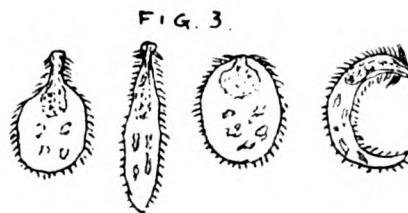
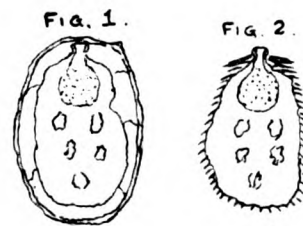
and a half inches. His legs and face were swollen, and presented the appearance of a patient suffering from hook-worm infection. Spleen and liver not enlarged, as in our first case. The heart dulness was enlarged and the sounds muffled, except over the base, where there was a loud anæmic murmur. Conjunctiva and finger-nails were colourless.

The blood examination showed only 10 per cent. hæmoglobin. Differential count of the leucocytes showed:—

Polymorphonuclears	...	...	71 per cent.
Eosinophils	...	...	10 "
Lymphocytes, small	...	...	11 "
" large	...	...	8 "

Number counted, 112.

Poikilocytes and microcytes were numerous, with a fair number of megalocytes. No nucleated red cells were found.



Schistosoma japonicum. FIG. 1.—Appearance of egg as passed in faeces. Embryo inside. Cilia do not show on sharp focus. FIG. 2.—Embryo outside of egg, at rest. FIG. 3.—Shapes assumed by free embryo in recently voided faeces.

Patient entered hospital April 26th, 1906, and was at once given full doses of iron preparations, combined with strychnine and quinine, the latter in small doses. He improved rapidly, and on May 12th his conjunctiva was pink, and the hæmoglobin had increased to 35 per cent. The œdema of the legs and scrotum was still present, but the stools were only three a day, and the prolapse of the rectum was almost gone. There was no blood nor mucus apparent in the stool. Microscopic examination of the stool showed a few eggs of *Ankylostomum duodenale*, *Tricocephalus dispar*, and many of the ova of *Ascaris lumbricoides*; no eggs of the fluke under discussion were seen at this examination, although they had been found in previous examinations, and were also found subsequently. This fact is mentioned to show the necessity of repeated examinations in suspected cases, for if there is no point in the bowel that is ulcerating at the time, it is probable that no eggs will be present. It seems to be a well-established fact that the fluke does not thrust the eggs directly into the bowel but into the submucous tissue,

and that they act as a foreign body and eventually ulcerate out into the bowel.

June 8th. Patient was given 45 grains thymol in three doses and expelled eight hook-worms. Subsequent examinations showed none of the eggs of this worm present in the fæces.

June 16th. The patient left hospital. All œdema was gone, and there was no dyspnoea when patient walked about. Prolapse of rectum and dysentery had also disappeared, and patient declared that he was suffering no inconvenience whatever.

The microscope showed under a single cover-glass several eggs of *Schistosoma japonicum* and half a dozen embryos outside the shell moving their bodies vigorously, assuming all sorts of shapes, but making very little progression. The pressure on the cover-glass had been very moderate, and I am inclined to think that they had hatched out of the eggs after the stool was passed, about four hours previously, the weather being very warm. The movement of the cilia was very active, and the sac connected with the protuberance more clearly outlined. This was the first time I had ever seen movement in the embryo, but other examinations had been made in cool weather.

The third case is one seen by Dr. H. B. Taylor, of Ngankin, Anhwei Province, and I am indebted to him for the notes on the case, which has just been reported to the *China Medical Missionary Journal*. His case is interesting because there was no infection with the hook-worm, as was the case in all previous infections found in China, including Catto's, and it is of further interest because the patient was not œdematous, but on the contrary was much emaciated. The notes on the case are as follows:—

"The patient, a Chinese boy, aged 11, was a native of Wang Chiang Fu, about forty miles from Ngankin, near the Kiangsi border. He gave a history of chronic diarrhoea of many years' standing. The stools were bloody at times. Accompanying the diarrhoea there had been gradual enlargement of the abdomen and progressive weakness and emaciation. No history of œdema at any time.

"The boy was extremely emaciated, face, body, and extremities. Liver much enlarged, and three or four finger-breadths below the costal margin very tender, with rough nodular feeling on palpation through thin abdominal walls. Spleen also much enlarged, tender, but without nodular feeling. Intestines distended with gas.

"The first time the patient came to our dispensary the stools were formed and contained no blood microscopically. On examination, the ova of *Schistosoma japonicum* were found in small numbers, along with many of *Ascaris lumbricoides*. Subsequently the patient returned with dysentery. The ova were again found. This diagnosis was kindly confirmed by Dr. Logan, of Changteh, to whom I sent a specimen, and whose cases of schistosoma infection were reported in the *China Medical Missionary Journal* last year.

"At this time the boy was weaker, and more emaciated than at the previous visit. His abdominal symptoms remained as before. He remained three weeks in the hospital on iron and tonic treatment without material benefit."

It would thus appear that the disease under con-

sideration is widely distributed in China, as it is now definitely settled that the three provinces, Fukien, Anhwei, and Hunan, each being separated from the other some hundreds of miles, furnish cases of the disease.

THE HÆMOGREGARINE OF MAMMALS (*H. BALFOURI*), AND SOME NOTES ON RATS.

By J. BURTON CLELAND, M.D. Ch.M.Syd.

Government Bacteriologist and Pathologist, Perth, W. Australia.

(From the Pathological Laboratory, Department of Public Health, Perth, W.A.)

It may be of interest to record, for Western Australia, the occurrence in a specimen of *Mus decumanus*, the "Norway" rat, of a hæmogregarine apparently identical with that referred to by Dr. Balfour in his article on the "Hæmogregarine of the Jerboa," in the *JOURNAL OF TROPICAL MEDICINE* for March 15th, 1906. In speaking of *H. balfouri* of the Jerboa, he says: "I have recently discovered what seems to be the same parasite in the mononuclear leucocyte of the Norway rat (*Mus decumanus*) in Khartoum. It is probable that it exists as a leucocytozoon in the rodents, but further observations are required."

The rat in which the leucocytozoon was found was one of many received and examined in this Laboratory in connection with plague work. Many of these were dead when received, but some were alive, and films of blood and smears from the organs were examined in a number of instances, and always when pathological conditions were present. In all the many preparations examined in this way this was the only instance in which the leucocytozoon was met with. Trypanosomes were frequently seen, but it is interesting to state that they were only encountered in those rats which were examined immediately after death. It is a remarkable coincidence that it was on the day after reading Dr. Balfour's article that the protozoon was discovered, and that neither before nor after that date have I again encountered it, though it could hardly have escaped notice had it been present. This particular rat, which had been kept alive in the Laboratory for about a fortnight, was given chloroform, and examined, when the only point noticed was a somewhat enlarged spleen. Only two blood smears were unfortunately obtained, both of which show fairly numerous beautiful examples of a leucocytozoon in the protoplasm of the mononuclear leucocytes. This parasite agrees perfectly with the figures and description in Dr. Balfour's article, and is, I think, undoubtedly the same. Sections were made of the liver and spleen, but no parasites were found in the fixed cells of these parts, though one was seen in a leucocyte in a capillary of the liver.

In the smears from the organs of this rat, made immediately after death, cocci and bacilli of several species were seen. It happened that at this time we lost a number of rats which we were keeping for experimental purposes. In those of them which were chloroformed while sick we found in smears quite a

number of organisms, though of course in these there could have been no *post-mortem* increase. Some of these were even bipolar, and suggested at first infection with plague. I could not account for some time for this apparent epizootic, in which were present during life so many diverse organisms. However, we found that in many instances the hind-legs were œdematous, and on examining the soles of the feet, ulcers of varying size were almost always found, swarming, of course, with bacteria. This condition was undoubtedly due to damp cages, and ceased when this defect was rectified. It suggests that even in their natural haunts this species of rat must suffer severely from the dampness accompanying floods and heavy rains, which possibly may have a checking effect on their numbers, and drive others to drier localities.

“C. R. Soc. Biologie,” T. lx., pp. 349-350.

GLOBULAR RESISTANCE IN BILIOUS HÆMOGLOBINURIC FEVER.

Vincent, H., and Dopler, C., state that a chronic malarial subject cannot absorb quinine without provoking a crisis of hæmolytic.

His red corpuscles are constantly less resistant to quinine than those of healthy people, and become even less so during such a crisis. Treated with hypotonic solutions of sea-salt the corpuscles, constantly less resistant than those of the healthy, are even less so from the access of a crisis initiated by quinine.

After some days their resistance returns to the normal, and this enhanced resistance may be explained from the formation of new bodies in the blood as a sequel to the auto-hæmolytic. It may be noted that nine days after the crisis the serum of such a subject becomes less agglutinatory for its own corpuscles.

Searching for some explanation of the diminished resistance to quinine, the authors examine and reject the following hypothesis: That there are an insufficiency of “antisensibilisatrice,” or an excess of cytase, or a lack of anticytase. We are left to suppose that the corpuscles are more fragile either from an insufficiency of the lepidoid substances described by Overton or by a want of salts. In support of the latter supposition, they remark that, on the one hand, preventive injections of artificial serum in the patients may initiate a crisis of hæmoglobinuria, while on the other, the red corpuscles taken at the full crisis when their resistance to hypertonic solutions is at its least, may be rendered more resistant by prolonged contact with a less concentrated solution (1 to 100, about,) of chloride of calcium.

“Lancet,” August 16, 1906, p. 438.

(SPIROCHÆTA DUTTONI.)

Stephens, Dr. J. W. W. The note concerns itself with methods of staining, especially with the demonstration of the flagellæ. The nitrate of silver method failed in the author's hands owing to the difficulty of cleansing the spirochætes from the albuminous blood plasma, even after repeated centrifuging and washing. He, however, obtained beautiful results by the following methods: The material was centrifuged and washed three or four times in normal salt solution. Films of the deposit were then made, and after mordanting, stained with gentian violet. The following forms were observed: (1) With terminal flagella no bipolar or peritrichous flagella were observed; (2) linked forms; (3) eviscerated forms, probably due to mechanical or chemical action. In many cases a sort of sheath was observed.

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THE

Journal of Tropical Medicine

OCTOBER 1, 1906.

KITASATO'S SUGGESTION OF AN INTERNATIONAL CONFERENCE TO FIGHT PLAGUE.¹

PROFESSOR S. KITASATO suggests that a national conference be formed to fight plague in India and South China. This opinion is the result of close observation of the epidemiology of plague ever since 1894, when Kitasato first discovered the plague bacillus in Hong Kong. He is of opinion that it is useless to fight plague by the present means, each nation individually enforcing quarantine laws, passing special regulations, disinfecting cargoes and people, and applying locally and generally all the paraphernalia attaching to modern hygienic measures. Kitasato is of opinion that the foci of the disease must be dealt with, and as at present India and South China are the chief seats of plague the battle has to be fought at these cradles of the disease. There can be no doubt that the Japanese and several nations in Europe blame British laxity of action for the present state of the world in regard to plague, and we have already, in this Journal,

¹ A paper read at the third annual meeting of the Philippine Islands Medical Association, March 3rd, 1906, and published in the *Philippine Journal of Science*, June, 1906. By Professor S. Kitasato, of the Institute for Infectious Diseases, Tokyo, Japan.

broached the question of interference of other countries in a matter which, as regards India at any rate, is wholly a British question. That interference has entered many minds there can be no doubt, and it comes to this: Are we to muddle through and allow things to drift on as they are doing, or wait for a request from other nations to take the matter in hand?

No doubt regard for British sensitiveness has restrained other Governments forwarding a request of the kind, but if plague recurs in India during the coming winter, to the extent it did during the winter of 1904-5, there are indications that a combined request may be forthcoming. Kitasato has publicly voiced the matter, and in his speech he asks the President of the United States of America to take up the matter. His words are as follows: "My suggestion only lacks a leader, and I see that the United States, one of the greatest nations of the earth, has such a leader in the person of its President, Theodore Roosevelt, who has already done so much for humanity and whose noble works are being admitted by the whole world." A better leader in a movement of the kind than the President of the United States it would be difficult to find; but surely, with the warning of what may be impending before us, it is possible to find a man or men of British nationality to forestall the interference and to rise to the occasion. What is to be done is another matter, and what is not being done in India is not perhaps so apparent; but that what we are doing is not satisfactory to people of other countries is becoming evident. Interference in Indian matters, military, political and medical, by the home Government, or by Parliament, has been, and is, a delicate question; and it is the desire to spare the feelings of Indian public servants generally that has deferred the enforcement, and not only the enforcement but even the direct suggestion, of many public questions which those outside India regard as requiring amendment. In the public press, in the meantime, the subject of "Our Failure in India" is being discussed. We have not failed in India, we have brought peace, order and security of tenure to some 300,000,000 of people where there would have been strife, bloodshed and chaos. Were Britain to have done nothing else, her rule in India has entitled her to the highest pinnacle of fame, and the men who have gained for her an unequalled place in history by their work in India are entitled to all the honour, fame, and consideration that can possibly be bestowed upon them. Still, according to other people, in regard to this question of plague epidemics, all is not as it should be, and we are submitted to the mortification of a Japanese scientist asking the President of the United States to undertake work which, in public opinion, we are not equal to. Kitasato states that plague, "however obstinate its ravages, could be fought and vanquished by the persistent efforts of man." The expenditure of "efforts, however laborious, the money, however vast, can be of no value unless they be accompanied by the application of scientific knowledge." According to Kitasato we are evidently lacking in the scientific knowledge necessary, and by allowing matters to drift we are inviting interference, which, when it comes, we will resent, and the sensitive occupants of the field in India will regard as an insult to their service.

Are we doing nothing? By no means; we have sent out commissions to investigate, but it seems to most people that the day for investigation is over, that the bacteriologist and the microscopist have done their work, and the *régime* of the practical sanitarian is required, not merely detailing for plague duty several already overworked men of the Indian Medical Service, but the temporary creation of an army of workers, not in hundreds but in thousands, to deal with plague. As Kitasato says, the money spent for this temporary work would be less than the plague expenditure incurred by the world at the present moment from quarantine hindrances, disinfection, expenses, loss of trade and loss of life. Unless a step of the kind is taken, and that speedily, we will have to bear the chagrin of the interference, justifiably or unjustifiably, of other nations coming forward and requesting us either to mend our ways and eliminate plague, or to allow them to do the work we are avowedly incapable of.

J.C.

BRITISH MEDICAL ASSOCIATION MEETING AT TORONTO, AUGUST, 1906—ABSTRACT OF PROCEEDINGS.

OBSTETRICS AND GYNÆCOLOGY.

President: Dr. W. S. A. GRIFFITH (London.)

PROFESSOR A. H. WRIGHT (Toronto) introduced the subject of "Concealed Accidental Hæmorrhage in the Latter Part of Pregnancy, before the Effacement or Dilatation of the Cervix." He pointed out that the patient in such cases suffered more from shock than from actual loss of blood. The treatment recommended was morphia to the extent of 1 grain in one hour if severe shock threatened. Dr. W. S. A. Griffith stated that dangerous hæmorrhage, of the nature referred to by Prof. Wright, was very rare; when, however, such occurred, in cases in which the cervix was tough and undilatable section of the uterus (vaginal) should be done; in multiparæ, when the os and cervix were capable of dilatation this should be done along with bipolar version. Dr. Temple (Toronto) and Dr. Murdoch Cameron (Glasgow) condemned Cesarean section for an ailment of this nature, nor was vaginal section of the cervix necessary according to Dr. Temple. Dr. Cameron stated that he had never seen a death from concealed accidental hæmorrhage in the latter part of pregnancy.

Chronic metritis and arterio-sclerosis of the uterus were discussed by Drs. Gardner and Goodall (Montreal). In uterine arterio-sclerosis, Dr. Barker said that nothing short of hysterectomy was of any use.

Dr. A. E. Giles (London) described the results of 146 consecutive cases of ventri-fixation of the uterus; the benefits in many instances were stated to be most marked. This subject was discussed by Drs. Bovée (Washington), Dudley (Chicago), Gardner (Montreal), Gilliam (Ohio), Temple (Toronto.)

"Changes in Uterine Fibroids, after the Menopause, with Reference to Operation," was dealt with by Dr. C. A. L. Reed (Cincinnati). He advocated removal of uterine fibroids occurring about the time of the menopause. This conclusion was refuted by Dr. J. T. W.

Ross (Toronto), who stated that a fibroid was merely an outgrowth of the muscular tissue of the uterus, and cancerous development in tumours of the kind was rare. Even in young married women small uterine fibroids might exist without causing trouble, and that their removal could not be undertaken without serious danger to the patient. The comparative harmlessness of fibroids, in proportion to the number of actual cases, was insisted upon by Dr. Byford.

Dr. H. L. Reddy (Montreal) brought forward the indications for Cæsarean section, other than in pelvic deformities and tumours.

"The Appendix Vermiformis in Relation to Pelvic Inflammation" formed the subject of a paper by Dr. Helme (Manchester). He discussed the association of inflammation of the appendix and pelvic organs, believing that contiguity rather than continuity of structure was the explanation of the association. Appendicitis, according to Dr. Helme, is a frequent source of dysmenorrhœa and its associated mucous colitis, but the association of appendicitis with pelvic disease is the exception and not the rule. The appendix, Dr. Helme regards, not as a vestigial structure but as a differentiated part of the intestinal tract which plays a high and important part in digestion. He condemns the removal of the healthy appendix during operations for pelvic disease. Dr. Lockyer (London) dealt with the relationship of appendicitis to pregnancy, and the treatment of the conditions when the two are combined.

Prof. Murdoch Cameron (Glasgow), in a paper entitled "Antistreptococcus Serum in Puerperal Septicæmia," advocated its use in puerperal fever in which there is but little laceration of the soft parts, but condemned its application as useless when the fever was due to traumatism.

The subject of "Eclampsia" was introduced by Dr. Evans (Montreal); he referred to Edebohls' treatment for eclamptic anuria by renal decapsulation. Lumbar puncture, introduced by Helme, had not proved successful. Dr. Temple (Toronto) favours blood-letting, the use of morphia, and where the cervix is dilatable the induction of labour in the treatment of eclampsia.

SECTION OF DERMATOLOGY.

President: Dr. NORMAN WALKER (Edinburgh).

"The Influence of Light-hunger in the Production of Psoriasis" was introduced by Dr. J. N. Hyde (Chicago). He said that one statement was that psoriasis never affects the lower animals because their skins are exposed to light. Another, that were psoriasis in man due to light exclusion the number of persons attacked would be few: the parts of the body attacked coincide with those least exposed to daylight; the disease should be localised in light-excluded parts; the rational treatment would seem to be that by illumination. Dr. Dühring did not agree with Dr. Hyde as to the etiology of psoriasis; it is certainly not parasitic, and the treatment by local measures are well-nigh useless, internal treatment presenting the only hope of relief. Dr. L. D. Buckley (New York) said local treatment was inadequate, and that the altered condition of the system permitted the growth of organisms. Drs. G. H. Fox (New York) and W. T. Corbett

(Cleveland) remarked on the apparent immunity of the Negro Race. Dr. Gilchrist (Baltimore) believed psoriasis to be of parasitic origin, and advocated the use of X-rays in the treatment of the disease.

"Bullous Eruption" was discussed by Dr. J. C. Johnston. He contended that bullous eruptions were autotoxic in origin, and required treatment by diet, laxatives, diuretics, exercise, hot-air baths and pilocarpin.

Dr. Graham Chambers gave a clinical demonstration of the treatment of ringworm by means of a preliminary X-ray epilation before applying the usual remedies.

"Errors in the Treatment of Cutaneous Cancer" were discussed by Dr. A. R. Robinson. He said no fixed rule could be applied to the treatment of these ailments; excision is unsuited for cancer on the skin of the face; X-ray treatment is of no value where the deeper structures are involved, and ought to be confined to certain specific forms; when X-rays are employed the superficial cutaneous layers and nodules ought to be removed by applying X-rays. Dr. R. W. Taylor (New York) maintained that coincidentally with primary local syphilis the whole system becomes affected by way of the blood rather than by way of the lymphatics.

"The Wrong and the Right Use of Milk in Certain Skin Diseases" was the subject of a paper by Dr. L. D. Bulkley. In cases of acne, eczema, and urticaria he found milk, given one hour before meals, when the contents of the stomach were alkaline, was absorbed without previous caseation, and proved beneficial; a vegetable diet should be combined with the milk treatment.

MALARIA IN GREECE.

LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

SIR ALFRED JONES, K.C.M.G., gave a lunch yesterday, at the University Club, to Dr. Savas, of the University of Athens, Physician to H.M. the King of Greece. Owing to ill-health Sir Alfred was unable to attend, and in his place the Lord Mayor of Liverpool (Alderman J. Ball) presided. Among those present were: Lord Mountmorres, Professor Boyce, Professor Ross, Professor Carter, Professor Bosanquet, Dr. Caton, Dr. Hope, Dr. Utting, Dr. Todd, the Rev. Arch. Gabriel, the Hon. J. L. Griffith (U.S. Consul), Mr. T. H. Barker (Secretary, Liverpool Chamber of Commerce), and others. A telegram was read from Sir Alfred Jones thanking the Lord Mayor for taking the chair. A letter was received from Mr. Matas, Minister for Greece in London, thanking the Liverpool School for their help in the movement for suppressing malaria in Greece.

On the proposition of the Lord Mayor, the loyal toast and the health of the King of Greece were honoured. The Lord Mayor then proposed the health of Professor Savas.

Professor Savas, in responding, said that he was sorry he could not speak the English language sufficiently well to express all he wished, but he desired

to say how he thanked H.R.H. Princess Christian for her assistance to the cause he represented, Sir Alfred L. Jones for the great help he had given the Liverpool School of Tropical Medicine, and Professor Ronald Ross. The interest shown in this country in the movement for the abolition of malaria in Greece was one of many instances of the kindness that Great Britain had always shown to his country.

Dr. Ronald Ross then gave an address dealing with malaria in Greece. He explained that on the invitation of the Lake Copias Company, Limited, he was sent out to Greece at the instance of the Liverpool School of Tropical Medicine to investigate malaria in that country. He went to Greece last May, and found such a condition of affairs as decided him to report to the Liverpool Tropical School and to the city generally. The way to investigate malaria was to examine the condition of the school children, and in the course of this work he found in one village 38 children out of 80 affected; in another 13 out of 40; in another 25 out of 50, and in a mountain town 16 out of 100. In the city of Thebes the proportion was only one in 50. The general statistics applying to the whole country showed that out of a population of two and a half millions roughly there were about a quarter of a million cases a year. There were 250,000 cases of malaria per year, and the deaths were about 1,760. Last year there was a bad epidemic, and the cases amounted to 960,000, the deaths numbering 5,916. On the average there had been, roughly speaking, two attacks of malarial fever for every five persons in the country last year. Of such a state of things they could have no conception in this country, for it was not a case of having the disease once, like measles or scarlatina, but the trouble came week by week and month by month. It was evident that the ancient civilisation of Greece was checked by some cause, and he was of opinion that the cause was the spread of malaria. The disease was probably introduced or reinforced by the natives of Asia, introduced by their Greek conquerors. They had a modern instance of the same sort of thing in the Mauritius in 1866, when the disease swept round the coast and ruined the place. Probably the event took place about the time of Pericles, and it must have done a great amount of harm. In considering the causes of the rise and fall of nations they were apt to overlook the influence of disease. The movement for the suppression of malaria was supported in influential quarters, and they hoped to obtain the support of the Liverpool people.

Mr. W. Watson Rutherford, M.P., said that Liverpool, with its associations all over the world, should take cognisance of a proposition laid so influentially before them. Very valuable work had been given in the direction of checking malarial disease by Dr. Ross, Prof. Boyce, and Dr. Todd.

Mr. Daniel Steele, General Manager of the Lake Copias Company, Limited, expressed his appreciation of the help extended to Greece in that matter, and his conviction that satisfactory progress would be made.

The Hon. J. L. Griffith, U.S. Consul, also spoke, and said that Liverpool had now the opportunity of paying part of the debt which all civilisation owed to Greece.

On the proposition of Lord Mountmorres the health of the Lord Mayor was drunk and the proceedings ended.—*Liverpool Courier*, September 18th, 1906.

NOTES ON PLAGUE IN INDIA.

RAT DESTRUCTION.

THE difficulties connected with rat destruction are many. One is the religious difficulty, as amongst several communities taking of life of any living thing is a strict tenet to be observed. Another, however, is more quaint; it seems that some people object to the rats being destroyed because they cannot then be warned when plague threatens; death amongst rats being a sure sign that plague will attack human beings. So far has this curious form of prophylaxis been seized upon the minds of natives that the British resident in Mysore finds it necessary to "dissipate the idea that it is useful to have rats in order that their dead bodies may give warning of the presence of the disease."

In the Punjab the decrease of mortality from plague was less by 300,000 during the first six months of 1906, compared with the corresponding period of 1905. To the destruction of rats is this fortunate result chiefly attributed.

Poona is suffering from a severe recurrence of plague. On September 11th and 12th, 268 persons in the city died of the disease.

Monkeys and cats are reported to be suffering from plague in some districts of the United Provinces.

Clemesha, W. W., Captain I.M.S., in an article in the *Indian Medical Gazette* of September, 1906, on "An Account of Plague in Bengal," states: "That for the spread of plague the presence of large numbers of rats is the chief factor; insanitary houses are also an element in the spread, but chiefly from the fact that such houses are obviously an abode for rats." People engaged at certain trades seem to be especially liable to plague, but when these come to be looked into it is found that it is not the trade itself that is the cause, but the environment in which the trade is carried on, that determines the presence of the disease. It is almost always the village shopkeepers who are first attacked by plague, and these men conduct their work in dark, rat-infested godowns, sheds, and grain-stores. So strong is Captain Clemesha's belief in the infecting power of the rat that he states: "A house so constructed as not to be suitable for rats to live in and not containing any food to attract rodents, would probably remain non-infected unless a case of pneumonic plague was placed in it." In Eastern Bengal plague does not now prevail, nor has this province at any time during the past ten years suffered severely from plague; the reason may be, that in this part of Bengal the villages are long, straggling lines of houses; each house usually is buried in a thicket of bamboos and rank vegetation in its own compound and at some distance from the neighbouring houses. Rats are not so plentiful in houses of this type as in the closely packed mud-houses met with in such districts as Bihar, where plague is rife.

IMMEDIATE INCISION INTO PLAGUE GLANDS.

Nesfield, V. B., Captain I.M.S., in the *Indian Medical Gazette* of September, 1906, argues in favour of early incision, in cases of bubonic plague, with the object of preventing toxin absorption. He states that in plague, as in other septicæmic infection, the specific organisms in the lymphatic gland are engaged in rapidly elaborating toxins which are readily taken up by the lymphatic and vascular systems and so produce a condition of poisoning. Within the gland, in time, however, the organisms themselves, owing to their numbers, cannot be accommodated in the space, and gaining the lymph and blood streams cause septicæmic lesions. The presence of the toxins in the blood tend to lessen the power of the resistance of the blood to the organisms, so that the longer the toxins are being absorbed the greater the ease with which the organisms gain access to and ascendancy in the blood. To prevent the further absorption of toxins, and subsequently of organisms, Captain Nesfield recommends that, where possible, every superficial gland should be opened with as little delay as possible. The gland should not on any account be excised; a simple incision should be made deeply into the substance of the gland, so that the toxic serum and plague organisms may have free exit, but the cellular tissues and periglandular lymphatics should not be disturbed. After opening the gland Captain Nesfield pours strong tincture of iodine lotion, about 2½ per cent., into the cut surface, and foment the part by lint soaked in the same fluid.

Reviews.

THE EXTRA PHARMACOPŒIA: MARTINDALE AND WESTCOTT. Twelfth Edition. London: H. K. Lewis, 136, Gower Street, London, W.C., 1906.

A revised edition of this useful publication is to hand. It is not, surely, necessary to dwell upon the excellence of this well-known book. Every medical man must have it at his elbow if he hopes to be cognisant of all that is most recent in therapeutics and the rational treatment of disease. The present volume extends to 1045 pages, and there is not a page too many, nor a line that can be spared. The labour, the care, the precision and the literary efforts involved in the production of the "Extra Pharmacopœia" have always excited our admiration, and the additions to this, the twelfth edition, still further bear out the reputation of its predecessors. We have frequently, when new drugs are forwarded to us from tropical countries, especially those in use by the natives, consulted Dr. H. Harrison Martindale concerning them, and in almost every instance he has been able to point out to us that the "new" plant or drug is dealt with in the "Extra Pharmacopœia." The chapters on Organotherapy, on Analytical Memoranda, and the Therapeutic Index of Diseases and Symptoms are special features of the twelfth edition, and we cordially acknowledge the debt we owe to the authors, W. Harrison Martindale, Ph.D., and W. Wynn Westcott, M.B., D.P.H., for the services they have rendered to British medicine by their arduous labours.

Correspondence.

THE TRUTH ABOUT BERI-BERI.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—You will perhaps allow me a small amount of your valuable space to acknowledge the whole-hearted acceptance by Dr. H. Wright in your Journal of August 15th (vol. ix., p. 246, 1906) of the truth of the observations I have set forth (*Journal of Hygiene*, vol. iv., p. 112, 1904, and *British Medical Journal*, vol. i., 1904).

Whilst he substantiates my observations so strongly as actually to claim them as his own, there will be many who will regret with me that he did not give public renunciation of the statements he had made ("Studies from the Institute of Medical Research," vol. ii., 1902) some time during the two years or so that elapsed between our several publications. This would have saved me from the unpleasant task of correcting some of his errors of fact and inference in detail, a task which two well-known men of science strongly urged upon me as a "matter of public duty."

I remain, Sirs, yours, &c.,

Hereford,
September, 1906.

HERBERT E. DURHAM.

Drugs and Remedies.

DR. PRENDERGAST'S diarrhœa pill:—

R Bismuth salicylate	...	...	grain 1
Salol	...	...	" ½
Calomel	...	...	" ¼
Camphorat. tinct. of opium	...	...	mins. 2
Aromat. chalk powder	...	...	q.s.
Cinnamon oil	...	...	q.s.

For one pill.

FORAMINT (*Medizinische Klinik*, No. 16, 1906).—Daus, Dr. S., of Berlin, speaks highly of the disinfectant action of formic aldehyde on mucous membranes. Hitherto the use of even very dilute solutions of formic aldehyde, owing to its extreme irritability, has prohibited its use, but by combining it with milk sugar this difficulty has been partly overcome. It is as a disinfectant for the mouth, fauces, tonsils and pharynx that this combination, named foramint, in the form of lozenges, has come into use. In acute follicular tonsillitis, mumps, quinsy, diphtheria, middle ear disease, foul tongue and breath, and as an oral disinfectant generally, foramint would seem to be more efficient and more practically useful than attempts at gargling or swabbing out the throat, which are often well-nigh impossible and always imperfect. We have tried foramint, and find the remedy to be both pleasant and efficient in mouth and throat affections.

Notes and News.

THANKFUL FOR SMALL MERCIES.—From a recent circular: Church Missionary Society, Medical Mission, Yezd, Persia The hospitals are now, thanks to God's blessing on our work, so crowded as to be very insanitary, and the Women's Hospital is totally unsuitable for its purpose.

DR. S. C. LEGGE, Surgeon of the B. I. steamer "Jelunga," has died in the General Hospital, Calcutta, of acute pleurisy, at the early age of 35 years.

How NOT to Do It.—At a recent meeting of the Bombay Corporation, during a discussion on the campaign against rats, Mr. Todd said he was assured by his Hindu friends that they perfectly realised the necessity of getting rid of rats. They set traps for them and caught them, but as they could not kill them, they let them loose in drains and open spaces.

A CORRESPONDENT of the *Indian Pioneer*, signing himself "Medico," complains of the absence of all practical teaching of Midwifery in the University of Lahore. It must be confessed, however, that the peculiar social system of India renders attendance of students in actual cases of labour almost impracticable. It is only as a last resource, in desperate cases, that a male practitioner is ever called in, and it is practically certain that even such cases would be left without competent assistance altogether, if students were allowed to accompany the practitioner called in. During twenty years' practice in India, though often called upon to perform craniotomy and other obstetric operations, the writer never had the opportunity of attending a normal labour in a native, and under such circumstances it is difficult to see how practice in this department can be arranged for students. This may be unfortunate, but, it is to be feared, is unavoidable.

THE HEALTH OF BOMBAY.—A Bombay message to a contemporary says: The condition of public health in Bombay continues to be unsatisfactory. The mortality last week was only a hundred short of double that of the corresponding week of last year. The main cause of this exceptional unhealthiness is the prevalence of cholera and choleraic diseases. There were 119 deaths from cholera—the highest total reported during this epidemic—and 99 from diarrhoea. But although the figures are higher than before, there are signs that the epidemic is about to wane, and unless abnormal conditions supervene the presence of the disease in our midst should not be protracted much longer. The unusual continuance of cholera in the city at this season has brought the water supply under suspicion, but these apprehensions are not founded on fact. The disease is spread all over the city, and local outbreaks have shown themselves amenable to preventive measures; so that although the water supply may in parts be liable to pollution, this cannot be the source of infection. Undoubtedly the food and milk supply of the people at this time of year has a good deal to do with the prevalence of diarrhoea, and that predisposes to cholera when the latter disease is about. The carelessness of the mass of the population in exposing their food and milk to flies and dust is also notorious, and this is a serious factor in the spread of infection.—*Pioneer Mail*, August 10th.

MAJOR ERNEST ROBERTS, I.M.S., has just brought out an extensive work on enteric fever in India, published by Thacker, Spink and Co., Calcutta. As yet

we have only before us a highly eulogistic review in the *Indian Pioneer*, a lay paper, which, however, frequently notices scientific works on subjects which, like the present, are of high public importance.

As Secretary to the Sanitary Commissioner and Statistical Officer to the Government of India, Major Roberts has had exceptional opportunities of studying the incidence of typhoid, so that the work can hardly fail to be of great practical value.

Major Roberts shows that typhoid for many years has been, and is still increasing, and this in spite of almost every cantonment having been supplied with excellent water. Added to this, enormous improvements have been accomplished in the care and cooking of milk and other articles of food, and in the housing and well-being of the soldier, in numberless ways, and all, as far as enteric is concerned, absolutely to no purpose. One thing alone has remained unchanged, and that is the official system of conservatism, which is still on the "trenching system." It is refreshing to find this pernicious military medical fetish attacked by one of the Inner Simla Circle, and it is a healthy sign of the times that such an one should be able to venture to attack it; for certainly, until lately, the heretic who dared to attack the sacred trenching system would have been hardly likely to stay long at Simla.

We trust that the Indian Government will see its way to adopt Major Roberts' suggestion of water carriage to septic tanks, as the present plan of distributing typhoid dust, by spreading the infected night-soil out in the sun, with a thin layer of dust over it, is so against rhyme and reason that it is marvellous that it should have been so long supported by the medical authorities in India.

PLAGUE IN CALCUTTA.—Dr. Pearse's report on plague in Calcutta during the year ended June, 1905, was submitted in August last. Dr. Pearse establishes a number of striking conclusions concerning plague as it operated in this city. He shows that the alleged comparative immunity of women is a delusion. The proportions of men and women attacked are precisely the same as the proportion of men and women in the total population. If fewer women are attacked this is because there are fewer women than men. Another lesson from the experience of Calcutta is that the danger of infection by personal contact with plague patients is much less than has been generally supposed. The great majority of plague cases occurred in separate houses, that is, plague patients did not infect other inmates of the dwelling. The result of Dr. Pearse's direction of the anti-plague campaign has been a flood of light thrown on the causes of death in Calcutta. In many cases, at ordinary times, no medical man is in attendance and the cause of death is not ascertained. The special arrangements in connection with plague have dispelled this ignorance, and revealed an unsuspected prevalence of phthisis, tetanus, and a number of obscure diseases.—*Pioneer Mail*, September 7th, 1906.

AN APPEAL FROM WESTERN CHINA.—Bishop Cassels has written from Tao-ning, Western China, a letter on behalf of missionary work in China, in which he

says: "It is many years since we have been so destitute of any medical help in this station and district as we are just now. Even though we had no doctor, we nearly always had some qualified nurse and someone who could undertake dispensary work; but now we are absolutely without any help of this kind, and the workers are so busily occupied that in case of any sickness requiring nursing we should be in a very difficult position." Those who would like to hear further on this matter should apply to Miss E. Van Sommes, Cuffnells, Weybridge. — *The Hospital*.

THE NUWARA ELIYA'S DISTRICT MEDICAL OFFICER.
—Dr. Frank Grenier's selection as Ceylon's first representative to the London School of Tropical Medicine may be regarded as a compliment to the District Medical Officer of Nuwara Eliya, who has the reputation at the sanatorium of having proved a worthy successor to the late Dr. W. G. Woutersz. Dr. Grenier does not leave for Europe till next year.

BEHRING'S REMEDY FOR CONSUMPTION: TULASE.—The material produced by Professor Behring for the cure of consumption, "tulase," consists of a clear liquid prepared by treating tubercle bacilli with chloral. A toxin, differing from Koch's, has been obtained from the tubercle bacillus, which is stated to continue the process of immunisation where Koch's tuberculin leaves off. Although tolerance to tuberculin may be established, persons so treated are not immune against the tuberculosis caused by Koch's tubercle bacillus, and it is to continue the beneficial effects of Koch's tuberculin that Behring has been striving after. Tulase contains the bodily substance (somatic) of Koch's bacillus. It may be introduced intravenously, subcutaneously, or by way of the stomach. The best result is obtained when tulase is given in the form of an immunising milk by the stomach. Tulase is not on the market, and will not be so, until the exact dosage and methods of exhibition are positively determined.

Personal Notes.

INDIAN MEDICAL SERVICES.

Arrivals Reported in London.—Captain F. Wall.

Extensions of Leave.—Major T. W. Irvine, study leave, July 1st to 7th, 1906; Captain V. E. H. Lindesay, 6 m. furlough; Captain D. C. Kemp, 9 d. extraordinary leave; Major A. Street, study leave, May 16th to August 15th, 1906; Captain H. Meakin, 6 m. medical certificate; Colonel R. Macrae, 3 d.; Captain L. Reynolds, 6 m. medical certificate; Lieutenant J. W. H. Babington, 3 d.

Permitted to Return to Duty.—Lieutenant-Colonel A. Milne, Major T. C. Clarkson, Major H. Austen Smith, Captain A. T. Pridham, Colonel R. Macrae, Lieutenant-Colonel O. H. Channer, Captain G. Tate, Captain R. Bradley, Nursing Sister Miss M. E. Gray.

Postings.

Captain Hunter, services placed at disposal of Government, United Provinces.

On return to India from leave, Lieutenant-Colonel Cunningham becomes Civil Surgeon of Umballa, while Lieutenant-

Colonel Adie returns in the same capacity to Ferozepur, and Lieutenant-Colonel Coates to Lahore.

Lieutenant R. T. Collins, R.A.M.C., to hold additional civil medical charge of Roorki.

Surgeon-General Trevor is confirmed as P.M.O., Western Command, and Surgeon-General Slaughter to be P.M.O., Eastern Command, *vice* General Gubbins, appointed P.M.O. in India.

Home Department.—The services of Major Macrae and Captains O'Neill, Scroggie, and Rogers are temporarily placed at the disposal of the Madras Government.

The services of Captain Justice are lent permanently to Madras.

The services of Captain Roberts are lent temporarily to the Punjab, and the services of Captain Bamfield are replaced at the disposal of the Commander-in-Chief.

Civil Assistant Surgeon Rai Sriput Sahai to be Civil Surgeon, Hamurpur.

Promotion.

Captain Vivian Boare Bennett, M.B., F.R.C.S., to be Major.

COLONIAL MEDICAL SERVICE.

Dr. W. B. Thain, Medical Officer of Ashanti, Gold Coast Colony, becomes Acting Cantonment Magistrate at Kumasi in place of Major T. A. Pamplin Green, who has arrived in England on six months' leave.

PLAGUE.

PREVALENCE OF THE DISEASE.

		Cases.	Deaths.
India.—Week ended	August 18th	—	1,451
	" 25th	3,037	2,113
	September 1st	3,503	2,522
	" 15th	4,304	3,134
Mauritius	" 13th	11	7
	" 20th	13	7
	" 27th	16	10

Hong Kong.—One case of plague during week ended August 26th. Clean Bill of Health issued.

Australia.—No cases of plague since June 30th. Rodents found infected in Brisbane in August.

South Africa.—No plague since November, 1905. Rodents occasionally found infected in East London.

Prescriptions.

MALARIA—ADMINISTRATION OF QUININE HYPODERMICALLY.

T. C. Wilson, in his "Text-book of Applied Therapeutics," gives the following preparations for hypodermic injection in malaria:—

R. Quin. hydrochlorat ... grains 7½
Aque destil. ... mins. 15

For one injection.

R. (Köbner's formula).
Quin. hydrochlorat ... grains 8 to 15
Glycerini ... mins. 30
Aque destil. ... mins. 30

For one injection; administered lukewarm.

R (When given combined with antipyrin).				
Antipyrin	...	...	...	grains 6
Quin. hydrochlorat	...	...	...	grains 15
Aquæ destil.	...	...	...	mins. 30
For one injection.				
R (Chlorhydrosulphate of quinine is recommended by Wilson).				
Quin. chlorhydrosulphat	...	...	...	grains 7½
Aquæ destil.	...	...	...	mins. 15
For one injection.				
R Sulphate of quinine may be administered when combined with tartaric acid.				
Quin. sulphat.	...	...	...	grains 15
Acidi tartarici...	...	...	...	" 8
Aquæ destil.	...	...	...	mins. 150

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Ann. d'Ig. Sper.," T. xvi., p. 199.

ON THE EFFECT OF PASSAGE THROUGH THE INTESTINES OF EARTH-WORMS OR SOIL GERMS.

Guargena, G. With rather unimportant exceptions, the author finds that the intestinal flora of the worms is the same as that of the soil, and that bacilli, whether found naturally, or artificially added to the soil, are but little affected by passage through the intestine of the worm. A strain of *B. prodigiosus*, however, increased in virulence while *Staphylococcus citreus* attenuated rapidly. The author, however, demonstrates the important fact that worms can carry germs to considerable distances and infect the soil of their new resting place.

"Malaria in Tonkin and Northern Assam," pamphlet, 11 pages, with Titles and Charts.

Salanoire, M., undertook an extended enquiry to clear up certain points in the etiology of malaria in these regions.

His results are combined into a table giving (1) for each station the proportion of ♀ anopheline to 100 culicine for each month of the year; (2) two curves showing the average annual proportion of the two sub-families and the incidence of primary malarial attacks; and (3) a curve showing the monthly proportion of *Anopheline* and *Culicine* for all posts taken together.

Admitting, as indeed the author does, that curves of this sort cannot be taken as having an absolute value, it is obvious that except in two posts, there is a definite relationship between the commonness of *Anopheline* and the incidence of malaria. At Ha Gian, one of these exceptions, *Anopheline* are very scarce, though it is the most malaria-stricken place in Tonkin. The surrounding country, however, swarms with *Anopheline*, and Salanoire therefore concludes that the disease is contracted not at the post itself, but on the way to it. The other exception, Quang Yen, on the other hand, is regarded as a healthy station, so much so, indeed, that it has been chosen as the site of a convalescent depot, but nevertheless the proportion of *Anopheline* is enormous.

Salanoire would explain this by the fact that most of the malaria cases are under treatment and so would rarely infect the insects, but it is obviously possible that it may be

a matter of the species of anopheline which is common there. *Anopheles rossi*, for example, is rarely if ever a carrier of malaria. The author then gives some details of the forms of parasite observed, and clearly holds the theory of the specific unity of malarial parasites, and finally deals with the subject of bilious hæmoglobinuric fever, which he considers quite distinct from the paroxysmal hæmoglobinuria of Europe.

"Annales del Circulo Medico Argentino," 1905, p. 375.

STREPTOTHRIX MADURÆ.

Greco, Nicolas. From the excellent clinical account given by the author of a case originating in an inhabitant of the Province of Santa Fé, in the Argentine Republic, it appears fairly certain that "Madura foot" occurs in that country. The patient had an inflamed lymphatic gland in the corresponding thigh, and Senor Greco isolated from the pus cultures of an organism, which he believes to be identical with Vincent's *Streptothrix (Discomyces) maduræ*.

"Ann. d'Ig. Sper.," T. xvi., p. 251.

A CASE OF HÆMOGREGARINA BOVIS.

Martoglio and Carpano. Working at the production of a serum for cattle plague, the authors found in a slide left over night some peculiar bodies which exhibited certain staining reactions.

Nothing similar could be found in the blood of the calf that had yielded the blood from which the slide was made, and the blood injected into a sheep produced no infection. But the structures are, nevertheless, described under the above name. Under the circumstances the authors would have been better advised had they refrained from naming these problematical appearances. It is very possible that a species of *Hæmogregarine* may be found at some future period in the blood of cattle, and as the identification of any such find with this should be called *Hæmogregarine bovis* is clearly out of the question; a very eligible name has been occupied to no better purpose than the gratification of the passion for species-making.

"Ergeln. d. allgem. Path. und Pathol. Anal. des Menschen und der Tiere," T. x., p. 305.

THE TRYPANOSOMIASES FROM THE STANDPOINT OF GENERAL PATHOLOGY.

Sauerbeck, Ernst, whose recent work on the pathological anatomy of this disease specially fits him for the task, here follows out his subject in a sound and competent manner.

After a brief account of the morphology and phylogeny of the trypanosomes, the author first considers the non-pathogenic members of the group, such as the *Tryp. lewisi* of rats and *T. paddy*, Laveran and Mesnil, and then proceeds to the consideration of the pathogenic species. Most space is devoted to *T. brucei* as in all respects the best known member of the group, and includes an able criticism of the views of Bradford and Plimmer (plasmodial and amœboid forms, &c.), and of Prowazek's sexual forms. Convenient tables are given of the liability to, and duration of the malady in different animals, as well as a good *résumé* of his own researches.

Surra, Caderas, and Dourine are treated in a few pages, and human trypanosomiasis occupies but three; Indian fevers and the Leishman-Donovan bodies are treated with greater minuteness, and he shows how Leishman's original theory has had to be modified by the work of Major L. Rogers, though he does not consider that the latter has demonstrated the presence of true trypanosomes in his cultures. He compares the examples of *Piroplasma donovani* with that *Halteridium* or *Hæmoproteus noctuæ* of Schaudinn.

He points out that the trypanosomes at present include a great variety of types, the extremes of which are the true trypanosomata, which are exclusively extracellular parasites, and the *P. donovani*, which is always intracellular, and pre-

dicts that subdivision of the group will be necessary. A short appendix on methods of staining is included.

"Zeit. chir. f. Hyg.," T. Ixii., p. 512.

The same author gives an account of some work supplementary to his recent study of experimental trypanosomiasis, in which he demonstrated the capital importance of the macrophages in the destruction of trypanosomes. He now describes the appearances in the bone-marrow of a moribund guinea-pig infected with nagana, and of a rat with caderas, and confirms Prowazek's discovery of the presence of trypanosomes in the interior of typical polynuclear leucocytes.

"Lancet," September 22, 1906.

BLACKWATER FEVER DUE TO QUININE.

The journal comments on a case of the sort reported by Dr. A. D. Ketchen in the *South African Medical Record*.

The patient had suffered from malaria in East Africa, and recovered under quinine. Six months later, at Cape Town, he fell into ill-health and suffered from dysentery. Under these circumstances the malarial symptoms occurred, and on quinine being again exhibited he developed hæmoglobinuria, and frequent subsequent attempts to administer the drug—intentional and accidental—showed that the urine blackened within a very short time, even after such small doses as $\frac{1}{2}$ grain.

The *Lancet* appears to regard this as "conclusive"; but though no one questions that quinine may cause hæmoglobinuria in susceptible persons, as such cases are not very rare, it is quite a different matter to assume that toxic symptoms of this sort are identical with blackwater fever, and the readiness and rapidity with which the patient recovered from repeated attacks as soon as quinine was withheld appear to point to quite an opposite conclusion.

"Lancet," September 15, 1906, p. 718.

ANKYLOSTOME PARASITISM AMONG THE NATIVE WORKERS IN THE TRANSVAAL.

Posnet, W. G., records that as far back as 1904 he met with a case of ankylostomiasis in a native prisoner in the Johannesburg Gaol. He has since, as pathologist to the Johannesburg Hospital, investigated the prevalence of the disease amongst native African miners on the Rand, and found the ova of the parasites in the stools of 82 per cent. of the cases examined. Although not commonly a direct cause of mortality, he regards the disease as a potent cause of disability and diminished resisting power, and points out the danger to white miners, suggesting, indeed, that the outbreak in our Cornish mines investigated by Haldane and Boycott in 1902 was imported from South Africa, by Cornish miners who were driven to seek work at home by the late war. He has found the parasite in African miners coming from so many parts of British and Portuguese South Africa that he believes the disease to be very widely spread among the native tribes, and points out the danger to those engaged in the mining industry, white and black alike, unless suitable measures be taken to cope with the spread of the disease.

"Ann. Soc. de Méd. de Gaud.," T. xxiv., p. 231, and "Arch. Parasitologie," T. x., p. 160.

CONTRIBUTION TO THE STUDY OF TRYPANOSOMIASIS: THE PROLIFERATION OF TRYPANOSOMES IN THE ORGANS.

These observations were carried out on rabbits infected with *Tryp. brucei*, in which animals the disease runs a rather protracted course, and but few parasites are to be found in the circulation, so that the estimation of the numbers found in the various organs is easy. The experimented animals were killed at various stages of the disease, and the blood and organs examined in the fresh state. In the case of the latter the tissue was triturated in physiological solution.

The results are given in a table, and the author concludes:—That the parasite multiplies first at the seat of inoculation,

the peritoneum—*e.g.*, showing this up to the tenth day after inoculation in this situation. The infection then extends to the blood, and it is at this stage that the parasites are most numerous. Soon the trypanosomes settle themselves in the testicles, orchitis being commonly observed. The lymphatic glands are invaded in their turn, and afterwards the cellular tissue, the skin, in œdematous patches, and the nasal mucous membrane.

In all these organs the parasites multiply progressively with the well-known organic troubles common in the disease, and correspond exactly with its clinical history; but the secretions, such as the semen, conjunctival pus, &c., remain free from parasites.

In the spleen, salivary glands, liver, kidneys, suprarenals, lungs, brain, spinal cord, lachrymal glands, thyroid, thymus, bone-marrow, and ovary examination give uniformly negative results, save on a single occasion in the two first mentioned organs.

In short, in the rabbit, *Tryp. brucei* may be more abundant in certain organs than in the blood, and these organs are precisely those which suffer from functional troubles and coarse lesions.

VARIATIONS IN THE ELEMENTS OF THE BLOOD IN NAGANA.

Goebel, Oswald, and Demoor, Albert, in the following issue of the same periodical, p. 137, confirm Van Durme's work on the rabbit by observations on the guinea-pig, in which death takes place in fourteen to twenty-five days.

The parasites make their appearance in the blood in three to six days, and at first the trypanosomes multiply rapidly, but this is followed by a diminution, succeeded by a second multiplication during the last two or three days before death.

During the remission the parasites are fairly numerous in the lymphatic glands and very abundant in the testicles, while none are to be found in the other organs.

This growth of the parasites is associated with a fall in the number of red corpuscles, which may be reduced to a third of their normal number, though there may be a slight increase for a few days before death.

The onset of the disease is marked by marked hypo-leucocytosis, but at the end there may be a return to the normal, or even slight hyper-leucocytosis. The number of polynuclear corpuscles is directly proportional to that of the trypanosomes, while the lymphocytes are inversely proportional. The large mononuclear corpuscles become increasingly numerous to nearly the end of the case, and often contain inclusions, which are probably the remains of trypanosomes. There is no increase of eosinophil leucocytes.

"Boll. R. Acad. Med. de Genova," 1906, p. 15.

THE LESIONS PRODUCED BY TRYPANOSOMA BRUCEI IN THE EXPERIMENTAL INFECTION OF DOGS.

Massaglia, Alda, on "Sundry Observations on Experimental Trypanosomiasis, and on the Biology of the Trypanosomes," *ibid.*, p. 6.

The author continues his last year's study of the lesions caused by *Tryp. evansi* in mice, rats, and guinea-pigs by some researches on the infection of dogs with *Tryp. brucei*, and obtained similar results.

The most gravely affected organs are the kidneys, which show hæmorrhages into the cortical substance, albuminoid and vascular degeneration of the epithelium of the tubuli contorti, and Henle's loops, nuclear chromatolysis, and caryolysis. In short, subacute hæmorrhagic nephritis. The cortex of the suprarenals show indications of functional hyperactivity, the liver of subacute hepatitis with fatty degeneration. The adenoid tissue of the spleen is thickened, the splenic pulp shows abundant hæmorrhages, with infiltration of polynuclear leucocytes, while in the Malpighian bodies there is an increase of lymphocytes and large mononuclear white corpuscles.

Glandular enlargement of the lymphatic glands, with hæmorrhages and infiltration of lymphocytes.

The bone-marrow is deep red to the naked eye, and is in a state of marked hæmatopoietic hyperactivity, and contains all the elements of the blood. Leucocytic counts were made in two of the dogs, as well as in some of the guinea-pigs, rats and mice infected with *Tryp. evansi*.

During the course of the disease there is marked hyperleucocytosis at first of all classes of leucocyte, but later on the polynuclear cells decrease in number, while the lymphocytes become more numerous. Figures given for a dog and a guinea-pig: the lymphocytes formed three-fourths of the total, while the polynuclear cells were reduced to 3 per cent. The red corpuscles are reduced to one-third, but maintained a normal appearance. In the earlier period of an infection the trypanosomes stain easily, but are rather smaller than those of following swarms.

Transferred to cerebrospinal fluid or to dropsical or amniotic fluid, the trypanosomes live for a short time. An intercurrent microbic infection (*c.g.*, by streptococci) causes the trypanosomes to disappear from the blood. At the point of death the infected animals were lithæmic.

"C. R. Acad. Sciences," T. cxlii., p. 1229.

EXPERIMENTAL INFECTION WITH *TRYPANOSOMA BRUCEI*. DESTRUCTION OF THE PARASITES IN THE SPLEEN.

Rodet, A., and Vallet, G., draw attention to the enormous destruction of trypanosomes in the spleen of dogs and rats infected with *nagana*, and carefully describe the various stages of the parasites met with in the spleen pulp.

They consider that the breaking up of the trypanosomes is an extracellular process, whereas it may be remembered that Sauerbeck, who studied this question by sectioning the affected tissues, shows that the destructive process takes place in the interior of the macrophages. The spleen juice of healthy dogs has a certain amount of destructive power over these parasites, and the same is true of the lymphatic glands, lymphoid tissue of the intestine, and the circulating blood.

M. Mesnil, commenting on his abstract in the *Bulletin de l'Institut Pasteur*, believes that the present authors have fallen into error, owing to their employing the defective method of smearing, instead of that of sectioning.

"C. R. Acad. Sciences," T. cxliii., p. 135.

THE TEMPORARY DISAPPEARANCE OF *NAGANA* TRYPANOSOMES IN INFECTED DOGS.

Roux, Gabriel, and Lacomme, Leon. Starting with Rodet and Vallet's demonstration of the destructive effects of the spleen on trypanosomes, the authors tried treating infected dogs with inoculations of ox spleen extract (spleen ground up, by means of Latapie's apparatus, with three times its bulk of physiological solution) in doses of 20 cc.

Three dogs were experimented upon. In two injected subcutaneously phagædonic staphylococcus abscess resulted, while the third, treated by intravenous injection, showed no local ill-effects.

In all three, however, the trypanosomes disappeared from the blood, but followed by relapse in the first dog after seven days, while the others had not been followed long enough at the date of publication.

While admitting the possibility of the disappearance of the trypanosomes may be connected with the supervention of the abscess, the authors prefer to believe it to be the direct result of the spleen extract. The entire publication, however, seems to be premature.

"C. R. Soc. Biologie," T. lx., p. 1065.

THE SIGNIFICANCE OF EXANTHEMATA IN TRYPANOSOME FEVER.

Nattan-Larrier, L., and Tanon. An European patient, from the Upper Congo, exhibited a vesiculo-papular rash on the arms and thorax, and a circinate erythema on the shoulder, hypochondria on the epigastrium, axillæ, and lumbar region, appearing in simultaneous crops and running their course in ten to fifteen days.

Smears of the fluid obtained by scarifying the patches of erythema showed numbers of trypanosomes, while none could be found in blood from the finger. Erythematous patches of the sort are, therefore, of importance in the diagnosis of such cases.

"C. R. Acad. Sciences," T. cxlii., p. 1482.

THE IDENTIFICATION OF THE PATHOGENIC TRYPANOSOMES. ATTEMPTS AT SERUM DIAGNOSIS.

Laveran and Mesnil. The material employed was the serum of three goats, the first of which had been cured of Zululand *nagana*; the second, first of *nagana*, and then of Indian *surra*; and the third, first of Mauritius *surra*, and then of the *nha-trang* of Annam.

In like case, the mixture of virus which will cure a goat with a variable quantity of the serum of that goat ($\frac{1}{10}$ to $\frac{1}{2}$ cc.) is harmless to mice. The authors have tried to ascertain how these serums react on other forms of virus, so as, if possible, to base on this a method of serum diagnosis for the different trypanosomiasis.

With some reserves, they conclude: (1) That the trypanosomiasis of Annam differs from that of India. (2) That the strong virus of the *Togo* of Marlini, which was unaffected by the serums of either of the three goats, is neither *nagana* nor *surra*. (3) That the virus of Schilling's *Togo* is not identical with *nagana*.

It may be noted that these serums were much less active when injected twenty-four hours previously, or at different parts of the body, though simultaneously, than if injected mixed with the virus.

"C. R. Acad. Sciences," T. cxlii., May 28, 1906.

THE RELATIONSHIP OF ANKYLOSTOMIASIS TO BERRI-BERI.

Noc, F. The author found *Uncinaria americana* (Stiles) in 74 out of 77 cases of beri-beri, and in 17 out of 82 Annamites residing in contaminated localities, but never in any one of 81 Europeans suffering from various intestinal complaints. He believes that ankylostomiasis is an important factor in the etiology of beri-beri, and asserts that the administration of thymol effects a surprising improvement in such cases. Our readers may no doubt remember that the anemia of coolies in the Assamese tea gardens was for a long period known as "beri-beri," until the disease was shown by Giles to be really ankylostomiasis. Have these cases of M. Noc any connection whatever with true beri-beri?

"Archives de Hyg. et Pathol. Exot," T. I., 1905.

HUMAN TRYPANOSOMIASIS.

Kophe, Ayres. The author has met with fifty-two cases of sleeping sickness from the various East African Portuguese colonies, and has found *Tryp. gambiense* in all of them. For diagnosis he prefers to puncture a lymphatic gland.

In every one of forty lumbar punctures the parasites were found in the cerebro-spinal fluid, even when no nervous symptoms were present, and the characteristic leucocytic perivascular infiltrations of the nerve centres were found in all of the thirty-six *post-mortem* examinations made by him. *Glossina (palpalis, longipalpis, wellmani)* were found in most localities where the disease exists. In only one out of thirty-four cases did the cerebro-spinal fluid yield any organisms when incubated on a variety of media. In this instance a diplostreptococcus was found, but M. Kophe nevertheless found this organism in half his autopsies.

No animal experimented on showed the characteristic perivascular lesions, though dog-faced apes and other monkeys were tried, and no better success attended inoculations of the diplostreptococcus, whether the animals were already infected with trypanosomiasis or not. Twelve patients were treated: arseniate of soda, in combination with trypanoth, was tried on two, but was found useless, and afterwards atoxyl was used exclusively, 10 to 15 cc. of a 10 per cent.

solution, every eight to ten days, being well borne. Under this treatment there was obvious improvement, the trypanosomes disappearing from the blood and lymphatic glands, though they persisted in the cerebro-spinal fluid.

The author explains this by the impermeability of the meninges, instancing the fact that he failed to find any iodide of potassium in the cerebro-spinal fluid of patients who were taking that drug. Sooner or later, however, all his cases succumbed. In one case atoxyl was injected into the arachnoid, but the case was already moribund. An inoculation of 10 per cent. lysol was well borne, and no trypanosomes were found after in the fluid drawn by lumbar puncture.

"Arch. Inst. Bacteriol., Camora Pestana," T. i., p. 171.

EXPERIMENTAL TREATMENT OF TRYPANOSOMIASIS.

Magalhães, A. de. The author tried arsenious acid, followed after forty-eight hours by trypanroth, on a number of infected rats, but with little or no success.

"Ann. Soc. de Méd. de Gaud," T. xxxvi., p. 52.

TRIALS OF RADIOTHERAPY IN EXPERIMENTAL TRYPANOSOMIASIS.

Nobelle, De, and Goebel. Their results were absolutely negative. (The Röntgen rays were employed.)

"Deutsch. Arch. f. Klin. Medecin," T. lxxxvii., p. 98.

THE TREATMENT OF PROTOZOAL DISEASES BY CONCENTRATED LIGHT.

Busek, G., and Tappheimer, V. It is well known that a variety of colouring matters so modify the action of light as to enable it to rapidly destroy living cells, and it was hoped, by first injecting such a colouring agent and then using concentrated light, that blood protozoa, such as trypanosomes, might be destroyed. With the exception, however, of eosine and erythrosine, all the dyes used were so rapidly decomposed in the blood as to be useless, and though trypanosomes and paramoecia immersed in serum so coloured were rapidly killed *in vitro*, the results of the authors' experiments on living animals were not sufficiently encouraging to lead them to hope much from this form of treatment.

"Preliminary Report of the Commission on Anæmia in Porto Rico."

Between March and November, 1905, 18,865 cases of ankylostomiasis were observed, the great majority of which were whites or mulattoes; but though the negroes were less frequently attacked than the whites, and appeared to suffer less in proportion to the degree of infection, many serious cases were to be met with among them. The annual death-rate from the disease is from 5,000 to 7,000.

The belief is expressed that in 99 per cent. of those harbouring the parasite (*Uncinaria americana*, Stiles) the infection has been contracted by the skin. Ground-itch (*magamorra*) is the first symptom of infection, and ankylostomiasis follows. Ninety-six per cent. of the cases of anæmia, in fact, stated that they had suffered from ground-itch, whilst among the healthy who had so suffered half had had the skin disease so long ago that the intestinal parasites might have been voided. The disease is specially rife in the coffee plantations, the work on which is mainly done during the rains. The Commission recommend treatment with thymol, five doses of which is sufficient to effect a cure, and their results are already remarkably encouraging.

"Le Caducée," September 15, 1905.

TEMPORARY DISAPPEARANCE OF TRYPANOSOMES IN DOGS INFECTED WITH NAGANA.

Roux, G. and Lacomme, L. In a paper read at a meeting of the "Académie" on May 28th, 1906, Rodet and Vallet described a series of experiments which showed that, in animals infected with nagana, the spleen is an active centre of de-

struction of trypanosomes; furthermore, *in vitro*, the spleen appeared to have a *trypanolytic action*. This suggested to Roux and Lacomme the following experiments, which were made with an emulsion of bullock's spleen:—

Three dogs were inoculated with *Trypanosoma brucei*; in from six to eight days trypanosomes were freely present in the circulation. The following day they were given 20 cc. of spleen emulsion; in from two to three days afterwards trypanosomes could no longer be detected, but in one of the dogs, in which a phagadenic abscess developed, they reappeared after an interval of five days.

This phenomenon of the temporary disappearance of trypanosomes in the blood of dogs infected with nagana, after the latter had received an injection of spleen emulsion, is an entirely new one, but one consistent with the prior observations of Rodet and Vallet, who had demonstrated the trypanolytic action of the spleen. This suggests the possibility of being able, by repeated subjections of spleen emulsion, to cause a final disappearance of trypanosomes from the blood of infected dogs.

The spleen emulsion is thus prepared: Take a fresh bullock spleen immediately after the death of the animal, if possible; triturate it in a Latapie crusher, dilute the product in a sterilised salt solution (7 in 1,000) in the following proportions: salt solution 3 parts, spleen 1 part; centrifugalise the emulsion, and inject the supernatant fluid either under the skin, or, preferably, into the saphena vein.—J. E. N.

"Bull. et Mém. Soc. Centr. Yétér.," T. lxxxiii., p. 363.

Lignières, L., records an instance of the infection of a dog with nagana in a fight with an infected coat.

"Journ. de Med. et de Chir. Prat."

TREATMENT OF MOSQUITO BITES.

Joly suggests the following mixture for allaying the irritation of mosquito bites:—

℞ Liq. formaldehyd (40 per cent.)	...	3iv.
Xylol	...	3iss.
Acetoni	...	3i.
Balsam canaden.	...	gr. xv.
Ol. citronelle	...	q.s.

Before applying, shake the mixture, and touch the bitten part with end of the wetted cork or small piece of cotton-wool, and then allow the fluid to dry on the skin.

"The Liverpool Medical-Chirurgical Journal," No. 50, July, 1906.

TROPICAL ABSCESS OF THE LIVER.

Newbolt, G. P., reports eight cases of liver abscess which he had operated upon. Four were single abscesses, and all recovered; four were multiple abscesses, and all died. The operation favoured by Newbolt is incision and free opening up of the abscess cavity, but he states that in a deep abscess, with a good deal of liver substance intervening, a special trocar and cannula is possibly of benefit in order to avoid hæmorrhage. In places in the Tropics also, where surgical assistance is unobtainable and the operation has to be conducted single-handed, the simpler operation by the trocar and cannula is commendable. Of the many points raised by Mr. Newbolt, the following are the more important: (1) In all the cases seen by him a history of dysentery has been obtained. (2) Acute hepatitis, leading to abscess of the liver, is due to micro-organisms entering the liver from the intestine by way of the lymphatics, blood-vessels, or biliary channels. (3) An hepatic abscess may present acute signs and symptoms at first, passing on to a more or less chronic form, in which the patient may get about, the presence of pus being completely or for the most part masked. (4) Of the many complications and sequelæ, a suppurating hydatid cyst, an empyema, primary malignant disease of the liver with fever, syphilitic gummata, are the more prevalent, and difficult of diagnosis. (5) The differential diagnosis between

the rupture of a liver abscess through the diaphragm, causing empyema, and perforation of a duodenal or pyloric ulcer attended by the formation of a sub-diaphragmatic abscess, and similarly, after perforating the diaphragm, causes empyema, is discussed by Mr. Newbolt, but nothing conclusive is established. (6) Tenderness over the appendix may or may not indicate that a collection of pus anywhere in right loin or right hypochondrium had its origin in the appendix itself. In some cases the pain in appendix was secondary to pus developed higher up the right flank, in others the pus from appendicitis invades the hepatic region. (7) The presence of *Amœbæ dysenteriae* in hepatic pus may or may not be an etiological factor in the disease. (8) Stitching the liver to the abdominal wall is, as a rule, impossible; when the liver is exposed, the area around should be packed with gauze, and the abscess remain unopened until four days subsequently.

"Journal of Economic Biology," 1906, vol. 1., part II.

THE EFFECTS OF METAZOAN PARASITES ON THEIR HOSTS.

Shipley, A. E., and Fearensides, E. G., of Cambridge, have studied the effect metazoan parasites exercise on their host from four standpoints: (1) By the mere presence of the parasite in some organ in which it takes up a certain amount of space and displaces a certain amount of tissue. (2) By the migration of parasitic organisms from one part of the body to another. (3) By the loss to the host, which has to feed the parasite, either on the half-digested contents of its alimentary canal or on its more elaborated fluids. (4) By the presence of certain toxins said to be given off by the body of the parasite, either as excretions or otherwise.

They found that metazoan parasites give off toxins which profoundly affect the tissues of their hosts. The fact of an association of a marked eosinophilia with the presence of parasites in the body seem to be a conclusive proof that toxins are given off in considerable quantities by all the better known human metazoa.

"Medical Record," August 18, 1906.

TREATMENT OF CHOLERA BY HYDROCHLORIC ACID.

Palier, E., suggests as a prophylactic against cholera liberal doses of hydrochloric acid with the addition of perhaps pepsin. For the treatment of the disease he recommends washing out the stomach with a 2 per 1,000 of hydrochloric acid in boiled water, and rectal irrigation by 1 per 1,000 of the same acid.

"American Journal of Medical Sciences," August, 1906.

**A NEW INTESTINAL PARASITE OF MAN: PARAMÆBA
EILHARDIA HOMINIS.**

Craig, C. F., of the United States Army, found in the fæces of six natives of the Philippines a parasite not hitherto described. Watery stools with occasionally small amounts of mucus and blood constitute the prominent signs. *Entamœbæ dysenteriae* were present in all the cases, and *Trichomonas intestinalis* in one case. The parasite appears to pass through an amœbic and a flagellate stage of development.

**"Philippines Bureau of Health Report," September, 1904,
to September, 1905.**

X-RAY TREATMENT OF LEPROSY IN THE PHILIPPINES.

Wilkinson, H. B., states that of 13 cases of leprosy treated by X-rays, 3 have been cured, 7 improved, and 3 not improved. Dr. Wilkinson's theory as to the reason for cure by X-ray treatment is that the leprosy bacilli are killed by exposure to the rays, and that their dead bodies are absorbed into the system, and render the persons thereby immune against the living organisms, just as injection of dead bacilli lead to immunisation in plague.

In support of this theory Wilkinson cites the following facts:—

(1) The treatment of one leprosy spot on a patient produces improvement in spots at a distance from the one actually treated.

(2) The cure in the distant spots seems to progress parallel to, and to be just as complete as in the one treated.

(3) The best results seem to be obtained only when treatment is pushed to the point of killing or beginning to kill the tissues, which would also probably be to the point of killing the organisms.

(4) Cases in which there are massive localised leprosy deposits are most rapidly improved. As in these cases we have an abundant culture on which to operate, and thereby produce immunity more rapidly.

(5) In diffuse general involvement of slight degree or atrophic character where there are only a few scattered organisms we have had little success.

(6) In two well-advanced cases, where the amount of new leprosy tissue was excessively great, the improvement was marked and rapid, but followed by loss of general health and rapid physical decline. This may be an over-dosage, so to speak.

"Journal Royal Army Medical Corps," August, 1906.

MALARIAL FEVER CONTRACTED IN PORTSMOUTH, ENGLAND.

Copeland, Major R. T., and Smith, Major F., D.S.O., report a case of malarial fever in a soldier belonging to the Royal Garrison Artillery, who developed typical tertian ague, whose blood showed abundance of tertian parasites, and in whom the spleen was enlarged. The fever disappeared when quinine was given. The soldier had never been out of England, and the question of infection was diligently enquired into. In the first place, no mosquitoes were found in the barracks (Clarence) in which the soldier was quartered, nor were there any breeding places for mosquitoes near by. A source of infection may have been a fellow soldier, home from abroad, suffering from tertian fever, who was quartered in the same room. The soldier's father lived at Carisbrooke, in the Isle of Wight; he had been in India twenty-four years ago, but according to his statement, he never had fever. Eight days after visiting his father the soldier developed malarial fever; it is unlikely—not to say impossible—that the father could have given the infection to his son; infection was probably conveyed from the comrade in the same room in barracks. By what means the infection was conveyed is a question. Majors Copeland and Smith state that infection by a mosquito was impossible, as no mosquitoes were in the neighbourhood, and suggest carriage by flea or bug.

The case is interesting, but the solution of the mode of infection is, unfortunately, not accurately determinable.

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THE PRINCIPLES OF DIET IN TROPICAL CAMPAIGNS.

By ANDREW DUNCAN, M.D., B.S.(Lond.), M.R.C.P., F.R.C.S.
Fellow of King's College; Lieut.-Colonel I.M.S. (retired).

THE subject of the food to be supplied to our men in tropical campaigns has to be considered under many heads, amongst which may be mentioned the amount to be given, its variation, its qualification by a hot climate, and the causation of disease by food.

Relation of the Elements of Food to Work and Heat.—Formerly Liebig's theory held good, namely, that the albuminates of the food supplied the force, whilst the non-nitrogenous elements simply served for the production of heat. Lyon Playfair also stated that the transformation of the nitrogenous food in the body was sufficient to account for all the mechanical force without holding that the fats and starches had any share in it. But subsequently physiologists showed that the amount of nitrogen excreted during rest is nearly the same as that excreted during work. The view now generally held is that stated by Fick and Wislicenus, who compare a bundle of muscular fibre to a machine consisting of albuminous material, just as a steam engine is made of metal. Coal is burnt in the latter to produce force, carbonaceous matter is consumed in the muscular machine for a like purpose. Again, as the iron of the engine is worn away and oxidised, so is the muscle also worn away. Much more coal would be burnt in the steam engine with heavy than with trifling work; all forms of energy of the body are derived from the non-nitrogenous elements, hence, during increased work, an increase in the non-nitrogenous elements is required; but as there is also, as in the case of the steam engine, some wear and tear of the body, so it is requisite to supply an increase of nitrogenous material during this increased work.

Amount of Food in Campaigns.—The amount of food consumed must be estimated with regard to the amount of work the soldier has to perform. A fair day's work for an average man is held to equal about 300 foot tons per diem, a hard day's work about 550 foot tons. A march of 10 miles, in heavy marching order, equals 250 foot tons. But on service the soldier has much more work than his mere march; he has his fatigue duties in camp; there are, in fact, numerous additional occasions for more bodily and mental waste, and very likely the quality of the food supplied is not so good as in peace. Hence, De Chaumont laid down that a war diet should provide for a minimum of 350 to 400 foot tons, and be capable of being increased at the shortest notice to 500 foot tons. Such an amount would be furnished by a diet supplying—

Nitrogen	...	350 grains.
Carbon	...	5,500 "
Salts	...	450 "

whilst the increased number of foot tons would require—

Nitrogen	...	450 grains.
Carbon	...	6,500 "
Salts	...	500 "

Climatic Qualifications.—The income of food in the body results in an outcome of bodily movement and of heat, $\frac{1}{5}$ to $\frac{1}{6}$ being expended as mechanical force, and $\frac{4}{5}$ to $\frac{5}{6}$ as heat. With the increase of external heat Kering and Funke have shown that less production of body heat takes place. Hence, inasmuch as less heat is required to be produced in a hot climate, it would appear that less heat-producing material is required. Dr. Carpenter has shown that in very active work in hot climates the necessary temperature of the body is maintained by such active work. Again, in campaigns the first affections to appear in the men are those of the digestive system, whilst it is well known that in the East the more nearly the diet of the European is assimilated to that of the native, in the substitution of fruits and farinaceous substances for oleaginous articles, the less will be the liability to disordered digestion. Professor Maclean, of Netley, in this respect, used to warn his class never to eat meat more than once a day. Dr. Crawford held that in the Tropics the meat should be reduced and the vegetable increased. Mr. Stanley, the African explorer, testified against "gratifying the seemingly uncontrollable and ever-famished lust for animal food." Hence, in the Tropics, in peace time at any rate, the food of the soldier should contain a large proportion of fresh vegetable and less animal food. But with the onset of a campaign we have the entrance of the factor of excessive work. Is, then, the regime of peace in hot climates to be followed out in war? Speaking personally, a diminished desire for animal food and fat in the hot weather was experienced when *stationary* in any of the camps on the line of communication, but when *marching* no such feeling arose. Hence, it would appear that during *active* operations in a campaign in hot climates an extra meat ration is indicated; this was ordered in Lord Roberts' great Cabul-Candahar march and was fully enjoyed, nor did it lead to any digestive disorders. In the *resting* stage of a tropical campaign let animal food be in part substituted by vegetable, let the fats be diminished, the carbonaceous elements being furnished rather by the starches. In the *marching* and *fighting* stages, on the contrary, let the animal food resume its wonted proportion.

The above general principles should be conjoined with the following considerations: First, at the commencement of a campaign the ration must be *ample*. In the Egyptian operations of war in 1882 the men had to be fed for the first four days on preserved rations, a proceeding fraught with danger. Secondly, the food should be *varied*. Digestion is never so likely to be upset as when there is a monotonous diet. A good example of this was afforded during the first four weeks of the Abyssinian War, where the food was restricted to beef and flour with no vegetables. Bowel complaints immediately begin to be rife. The necessary variation may be obtained by the issue of the different tinned meats from Australia and New Zealand, but the greatest caution must be exercised in this particular. No tin should ever be passed which is blown out. As regards vegetables, compressed should never be used; they are tasteless and stringy and set up diarrhoea by their irritating mechanical properties; they have lost their albumen

and salts, and consist chiefly only of the cellulose frame work. They were universally condemned in the Chitral campaign, causing diarrhoea, and were, moreover, scarcely eatable unless soaked for twelve hours. It is also always preferable to drive cattle with the force, rather than to carry meat supplies. Lastly, never give salted and preserved rations at a stretch, or, in fact, never, if possible, let the men undergoing severe exertion have only tinned meat for more than one day.

With regard to the question of *alcohol*, there should be, of course, no daily ration of rum, but total abstinence is to be avoided. There are occasions when a ration of alcohol has proved to be of the greatest value, such as when the men arrive in camp drenched with a tropical shower, tired out, and with no change of clothes. But if possible, light red wines should be issued twice or thrice a week; these are grateful and refreshing in a hot climate, and greatly preservative against bowel complaints and cholera. Mr. Stanley recommended strongly their use. Where renewed exertion is required after a long march, a ration of rum is beneficial, as was shown in many campaigns, e.g., the Ashanti, the Galeaka-Gaika, the Eastern Soudan, &c. Lastly, alcohol, in the shape of a rum ration, is contra-indicated in all cases where bowel complaints, enteric, cholera and other zymotic diseases are likely to occur.

Preserved Foods in War.—Several varieties of these are on the market. In the African War, Kopf's Consolidated Soups were used and answered admirably. Whitehead's Variegated Soups were much liked. The most satisfactory of all was "Erbswurst," for it was highly nutritious and most easily prepared. A packet of this portable soup can be issued when it is impracticable to supply a full meat ration; in Lord Roberts' march each soldier had half a tin before starting the day's march. Maconachi's field ration was found to be excellent in Ashanti, in Egypt, in the Soudan, and in the South African Wars.

Scurvy in Tropical Campaigns.—Now that this disease has disappeared from our Mercantile Marine, owing to the ships carrying lime juice with them, scurvy probably is most frequently seen in India, especially on the N.W. frontier. Lime juice should always be part of the ration of war. I well remember being a member of a Committee on a certain regiment in Afghanistan, which had to be sent back on account of the severe outbreak of scurvy attacking it, fully one half of the men showing signs of the affection. In the China War of 1860, in Looshai 1871, in Suakim in 1885, there were outbreaks of scurvy, no lime juice being in the ration, whereas where this was given, as in the New Zealand War of 1863-65, in Ashanti in 1873, in Duffla, 1874, in Malay and Sunghi-Ujong, 1874-76, in Zulu, 1879, in Egypt, 1882, in Aka, 1883-84, in Dongola, 1886, amongst other campaigns, no scurvy appeared.

In recent wars, jam has been supplied to the soldier, this also, besides its anti-prophylactic value, is of good effect in counteracting the onset of fatigue by reason of the sugar it contains. Vaughan Harley has shown that 3,000 grains of sugar added to a small diet, increased the work done in the proportion of 6 to 39 per cent., whilst 3,700 grains added to a full meal,

with eight hours a day labour, increased the work accomplished by 22 to 36 per cent. Should lime juice not be present with the force, what other means have we? My friend, Surgeon-Major G. Griffith, when P.M.O. of the Suakim Field Force, stopped an outbreak by recommending the men to eat their rations from the animal directly it was killed. The late Professor Parkes also recommended that in lieu of common salt, bitartrate of potassium should be taken at meals. This was given with marked benefit to the 21st P. I., during their return from Abyssinia, when scurvy attacked them on board the transport. Lastly, on the occurrence of four cases of scurvy in the Mountain Battery to which I was attached in Afghanistan, I recommended a daily ration of vinegar, as we had no lime juice, and no further cases came into hospital.

In conclusion, to illustrate some of the above remarks, I now give the scale of diet allowed to us in Afghanistan:—

Fresh meat (exclusive of bone)	...	1 lb.
Bread	...	1½ lb.
Biscuit	...	1 lb.
Rice or flour	...	4 oz.
Sugar	...	3 oz.
Tea	...	¾ oz.
Salt	...	¾ oz.
Green vegetables when procurable	...	6 oz.
Potatoes	...	12 oz.
Dhall	...	1 oz.
Rum	...	1 dram.
Tobacco	...	½-¾ lb. per month.

During the march to Candahar the meat ration was increased to 1½ lb. and 1 tin Kopf given daily.

The diet gave roughly:—

Nitrogen	...	428 grains.
Carbon	...	5,298 "
Salt	...	346 "

The chief remark to be made concerning the diet is that the amount of carbon was too small and this was also shown in the increased diet for the Cabul Candahar march, for the only factor that distressed the men and officers was *fatigue*, the amount of carbon being 5,702 grains instead of 6,500 grains. To ensure a proper amount of carbon in the diet, cheese, in which the proportion of N. to C. is 1:7 should be added to the diet. Bacon is also an excellent article of diet to work on, the proportion of N. to C. being as 1 in 24, or porridge, the proportion being as 1 in 21.

FOOD OF THE NATIVES OF INDIA.

By MAJOR G. H. FINK, I.M.S. (Retd.), M.R.C.S.(Eng.), L.S.A.(Lond.).

THE subject of food of the natives of India, though a very wide one, is of interest from a physiological, chemical and economic point of view. It is almost imperative that medical men should study the food, its constituents, and the elementary or proximate principles in India if practising either in the great cities, or the Mofussil, as the country districts are termed.

We are told that "the enumeration and classification of the food or aliments necessary to maintain human life in its most perfect state have been usually based

in the deduction of Prout, that milk contains all the necessary aliments and in the best form."

Wherever you go in India, you will find that there is great value set on milk and its products; also on sweetmeats and sugar, by the Hindu population, from the upper classes down to the labourer. The cow is worshipped by the Hindu as sacred, because of both food and drink which it provides for human life. The Hindus boil their milk for a considerable time before drinking it, and they sweeten it very largely with quantities of either white or brown sugar, according to the taste.

There are three principal products derived from milk which the Hindus use, viz:—(a) Dhyé (sour milk after lactic acid fermentation has set in) which they take with sugar; and the poorer classes take it with the rice left over from the previous night's meal, and sweeten it with sugar. This is the first meal very often before going to their work, which is their breakfast. (b) Malié or cream, which is also eaten with sugar, or made into sweetmeats, which the middle classes—who are unable to return to the midday meal owing to business or duties in Government offices—consume as their lunch or *tiffin*, together with other sweetmeats. (c) Chhanah, or a firmly set curds resembling cream cheese, which is also made into square cakes soaked in syrup, and used as sweetmeats. (d) Clarified butter or *ghee*, which is used for cooking and frying all kinds of food. I need hardly discuss the value of each of these articles, which are well known to medical men, now that I have described them. In considering the diet of the natives of India one has to divide the diet of the Hindus and of the Mahomedans respectively; then subdivide each of these according to their *status* and wealth; and last of all consider the various castes, and caste prejudices of the former, since meat or flesh is allowed in the case of some, but withheld from others, owing to caste.

It is erroneous to suppose that the whole of the natives of India are vegetarians, in the strictest sense of the term. This idea seems to have gained acceptance from the fact, that the wants of the natives, chiefly the Hindu population, are few and simple, and that they confine themselves to the actual necessities of life in the matter of food. Also, because rice, pulse, flour for bread, vegetables and fruit are largely consumed. Rice and flour are the staple articles in use as food, because rice grows plentifully in some parts of India, and flour in others, and according to the one or the other being plentiful, so the people, whether Hindus or Mahomedans, use it, because it is cheap and meets their requirements and their purse. Pulse or dhāl is most generally used throughout India. It is a form of lentils, and is most nourishing, sustaining and fattening. There are several kinds—*moong*, *musoor*, *arhar* and *chānā*. *Moong* is considered the best but is more expensive than the others. It is a most appetising diet when made properly, and is usually served up with boiled rice or chappaties (flour cakes of unleavened bread). The labouring classes throughout India have this as a daily food with either rice or chappaties, according to the district or province growing rice or wheat plentifully. In Bengal proper, and Assam, rice is consumed more largely, while in Upper India, flour. Among the better and the

wealthier classes in Bengal and Assam, in addition to the above articles mentioned (rice and dhāl), fish, of various kinds, which is easily digested and contains a deal of phosphorous, is cooked as a curry in oil (the expressed mustard oil), and there is generally a vegetable curry also served up at the midday or the evening meal. Hilsah and Bekty fish are the best kinds used, and the former contains a deal of fatty matter, and in value is equivalent to mackerel, if not higher in its proportion of nitrogen. Some cheaper forms of fish are used by the rich as well as the poor, fish being very plentiful, as a rule. Mutton is also permitted to be eaten by Hindus, but in Bengal and Assam fish is preferred, owing to its properties being valuable for brain workers, and, being easily digested, is a suitable form of diet for those who lead a sedentary life.

Among the Mahomedan population, wherever you see them, they consume more flesh than the Hindus, and are permitted to eat either fish, fowl, mutton or beef. Even the poorer class of Mahomedans eat more animal food than the Hindus, but in some parts of India, Hindus are quite as strong on animal food (mutton and fish) as Mahomedans. The strictest vegetarians are the *Jains*, a sect of which a great many of the mercantile caste of Upper India are members. They abhor the taking of life in any form, and many of the strictest among them will eat their last meal before candle light, because the flame attracts insects and destroys them. "Jainism," we are told, "is one of the most important of the living cults among Hindus. It is professed by at least a million men, and some of these are among the wealthiest and most refined in the Hindu community."

Leaving Bengal and Upper India, we have to consider Bombay, Madras and the Central provinces. As to the consumption of rice and flour, respectively, by the inhabitants of these provinces, they follow much the same rule in the matter of *status* and *caste* as in Bengal and Upper India in the choice of their staple food, and the various additional articles of flesh, fish, vegetables and fruit, as well as pulse.

Ghi, or clarified butter, is an article of diet which both Hindus and Mahomedans of all classes believe strongly in as possessing valuable nutritive properties, and cannot be dispensed with in cooking their food as well as their sweetmeats of certain kinds, which need frying lightly or smearing over the surface with, to give it a flavour. The poorer classes in Bengal and Assam who cannot afford *ghi* (which is about one rupee the *sir* = 2 pounds), use *expressed mustard oil*, which is also valuable and goes a longer way than *ghi*. Expressed mustard oil is always used for cooking fish in, and as an inunction among the Hindus, who smear their children's bodies with it from the day of their birth, and later on in life use it over their hair, since it is supposed to have the excellent property of keeping away colds and catarrh, and this has been greatly proved by experienced and mature doctors in the country to be the fact.

I think, with regard to Madras, Bombay and the Central Provinces in the matter of food, Madras, which is adjacent to Bengal, in a large measure is similar in the consumption of the various articles of food in use among Hindus and Mahomedans respect-

ively. The Madrasis, of whom a large number are Roman Catholics, live very similarly to the way their masters live in the matter of food. Bombay holds a mid position between Bengal and Upper India; while the Central Provinces follow much the same line of diet as the United Provinces of Agra and Oudh, which is practically Upper India, including the Punjab.

I have left the question of drink, and that of air, out of this paper on the food of the natives of India, although I must say that great stress is laid by the natives of many parts of India on the various kinds and qualities of water for drinking and cooking purposes, since some are supposed to aid digestion as well as easy cooking of their rice and pulse, while others retard digestion and cooking.

If we analyse the various kinds of food in use in India by the rich as well as the poor, we cannot help coming to the conclusion that, on the whole, the food is fairly well balanced in the matter of the elementary principles of the diet of both Hindus and Mahomedans. The Hindus, though largely vegetarians, live on food rich in carbo-hydrates and hydro-carbons; but they are, at the same time, large consumers of milk and those products of milk which are healthful and nourishing. In Bengal and Assam, fish supplies largely the nitrogenous element; while in other parts of India, fish and mutton are used. The Mahomedans, who form about the fifth of the total population of India, live on very similar food to the Hindus; eat less sweetmeats; but more animal food (mutton, beef and goat's flesh). Their food, on the whole, contains a larger proportion of the nitrogenous principle than that of the Hindus. The poorer classes of both Hindus and Mahomedans (except the hunting class and the wandering tribes, as well as the sweepers, who are the lowest menials in our household and eat the leavings of our food), as a whole, though contented and happy with their rice and flour with lentils, have some cause for complaint in the matter of luxuries which they can barely indulge in. In seasons of rich harvests or poor harvests, their lot remains the same, and they are not one bit better off nor worse off. It is only in times of famine and great scarcity of food that they have to fight hard against disease and death, and then their lot is a deplorably unhappy one, until relief comes through the Government. There is not the least doubt that within the last twenty-five to thirty, or more years, the price of food has risen, and the rate of wages accordingly of domestic servants, which naturally hits the better classes under Government pretty hard. Moreover, milk and ghi, which the Hindu population attach such great importance to as articles of food, have risen in price, owing to the supply not being up to the demand; but these are questions which are outside the trend of this paper, and therefore cannot be considered here.

In taking the question of the food of the natives of India into full consideration, there is not the least doubt, that, on the whole, it is the most suitable to the climate and their wants, and is a diet which is economical as well as scientific, because the nitrogenous and non-nitrogenous principles, and the mineral salts and vegetable acids, are in that proportion which suits their constitution. In Bengal proper, the carbo-

hydrates and hydro-carbons consumed, are, I should say, somewhat in excess of the standard of health, among the better classes.

I have left the Parsi population of Bombay out of this paper, since their standard of living is more Western or European.

FOOD AND DIGESTION IN WARM CLIMATES.

By JAMES CANTLIE, M.B., F.R.C.S.

THE FOOD OF NATIVES OF THE TROPICS.

WE are usually told, and home-dwelling British folk believe, that the natives of the Tropics live on rice. During the Russo-Japanese War the newspapers, referring to the extraordinary exertions of the Japanese, stated, in reference to their diet, that all the hardships of the campaign were undergone by troops whose sustenance consisted of a handful of rice mixed with water. This misleading statement is in harmony with the rooted belief that the natives of the Tropics and sub-Tropics live on rice.

For China, the country best known to the writer, the same statement is believed to hold good. What are the facts? Every Chinese contractor engaged in any large undertaking knows that he can only get good work out of his men if he feeds them well. Their early morning meal consists of soft-boiled rice "conjee," but that is only the chota-hazra of the Indian. The forenoon meal, or breakfast, consists of fish, or fat pork, vegetables, rice and tea. The midday meal may be again soft-boiled rice, but the afternoon or evening meal consists also of fish, pork, vegetables, rice and tea. The rice is in no larger proportion to the meal, perhaps not quite so large, than is bread in the European breakfast. To say that the Chinaman lives on rice is, perhaps, not so near the truth as were we to state that the European lives on bread.

In almost every nation of the Eurasian continents, except in Britain, two main meals during the day, partaken in the forenoon and late afternoon, is the rule, so that the hours of diet and the kind of food is in China what is customary elsewhere. It is impossible to work, or even live on rice alone; it is impossible for soldiers, or for labourers, to continue for more than a day or two on rice alone and remain fit for duty. In British campaigns we know soldiers go for a day or two on a few hard biscuits, but three days of a biscuit diet, or even a bread diet, ends in collapse from semi-starvation. It is as true that British soldiers went through the South African Campaign on biscuits as it is to say the Japanese fought their arduous battles on rice. Yet does this insane belief, that the natives of tropical and of sub-tropical countries subsist on rice prevail, and the elimination of such nonsense seems impossible.

A VEGETABLE DIET.

Vegetarianism is a potent cult amongst a certain section of British town dwellers at present. It is regarded as if it were something new and advanced, and amongst what, for want of a better name, may be termed "cranks," vegetarianism is preached as if it were a new Gospel. "New" or "advanced" persons, be they men or women, amongst other fads affect

vegetarianism and regard an all vegetable diet as entitling them to be classed, with those types of degeneracy known, as "advanced" people. A so-called vegetable diet has been, and, it is hoped, will continue to be, the food of many stalwart people; it is nothing new; it is an all-sufficient and time-honoured means of sustenance, and is not the creation of modern minds. The belief that vegetarianism is a new cult is as true as that the natives of India and China live on rice; ignorance is the explanation of both beliefs, but the eradication of ignorance of this stamp appears an impossible task. The term vegetable diet is a misnomer for the most part, for it includes, as a rule, milk, eggs, and not infrequently butter and animal fats, in the form of dripping, &c., used in cooking. That one can subsist, thrive and work hard on this inclusive vegetable diet does not surely want to be told; in many countries we find it used. In the more northerly countries of Europe a diet similar to that consumed in the Eastern and North Eastern counties of Scotland amongst farm servants obtains. Take the diet of a farm servant in Scotland, at any rate, up to quite recently—Breakfast: oatmeal in the form of porridge with oatcakes and milk. Dinner: mashed potatoes or brose, *i.e.*, oatmeal with boiling water or hot milk poured over it and flavoured with vegetables, oatcakes and milk. Supper: cabbage, or kail, or potatoes, with oatcakes and milk. On Sunday: Broth made from beef bones or neck of mutton with vegetables. Beef or mutton was eaten only during a few days in the year—Christmas Day, New Year's Day, and perhaps on one or two other occasions. There was a vegetable diet, and, with the exception of milk, an all vegetable diet. Yet did these men thrive and work hard on this diet, and were as good specimens physically as any in the land. This is, from some standpoints, a more meagre diet than that of the Chinaman, who is foolishly believed to live on rice, and it is more simple and more thoroughly vegetable than professed yclept vegetarians follow, who frequently include not only all the vegetable products of the Orient—sage, rice, tapioca, &c., but also eggs and milk. It is therefore untrue that vegetable eaters are found only in warm countries.

VARIETIES OF FOOD.

Cow's Milk.—To home-dwelling Europeans it is incredible that milk is not used as an article of diet by people of every nationality. Several races, however, do not use milk in any form. The Chinese, and all other Mongolian peoples, constituting almost one-fourth of the entire population of the universe, do not drink milk, and several other races, especially the Malays of the Archipelago, follow their example. Babies in China, when weaned, are given the water rice is boiled in (Conjee), as we give milk to the children, and they thrive well upon it. In the districts of Scotland mentioned above, milk is (or was until quite recently), taken in larger quantity than by any other adult people in the world. The milk used is not the milk as it comes from the cow, with ten per cent. cream, but almost eight per cent. of the cream is removed by skimming (not separated), and the amount taken during the day would be between 2½ and 4 pints. It is doubtful if milk with the natural

amount of cream could be taken in such quantities without making the consumer "liverish"; on the other hand, separated milk (quite different in quality to skimmed milk), would, in all probability, be insufficient to give the nutriment required. No other section of the human race consume milk to this extent, and as the Tropics are approached, cow's milk is less and less used. Goat's milk is substituted in some parts; ass's and mare's milk, either naturally or in a fermented state, is taken, and buffalo's milk is used by some peoples. Buffalo's milk contains a much larger proportion of cream, some seventeen to eighteen per cent., but the skimmed buffalo's milk is poor in food-giving properties compared with cow's.

Europeans in the Tropics, wherever possible, import European or American cows for milking purposes, owing to the native cows, in the far East, at any rate, not yielding the same quantity or quality. Tinned milk, especially Nestlé's, is largely used by Europeans in warm climates. Were it possible to issue Nestlé's milk in smaller tins, there is little fault to find with its use in the Tropics; but owing to the size of the tin sent out by the Company, the contents cannot be consumed in one day, and in a tin once opened the contents rapidly become quite hard in a dry climate, or in a warm, moist climate they are apt to become mouldy. Were it possible to export Nestlé's milk in smaller tins, so that the opened tin need not be kept from day to day, it would be a great gain hygienically; but it is doubtful if it could, under these circumstances, be exported at a sufficient profit without largely increasing the cost to the consumer.

Sterilised milk, *i.e.*, fluid milk sterilised before being put in bottles, as that known as Dahl's, is theoretically excellent, but the cost and the difficulty of transport are rather prohibitive for general and continued use.

On board ship the absence of fresh milk is greatly felt by invalids returning to temperate climates, and sterilised milk is, perhaps, the best substitute under the circumstances.

In England, milk as an article of food has well-nigh disappeared in many country districts. In the neighbourhood of all large towns the farmer is pledged by contract to sell to the milk-agent from the town all he produces. The farm is a "tied-farm" as much as a public-house in the hands of a brewer is a "tied-public-house." The country children have to get along as best they can without milk, and as bringing up children at the breast is going out of fashion amongst even the rural population, the children are under fed, and rickets is more common in country villages round London than in the city itself. The rural population of large parts of England at the present moment have the poorest diet of perhaps any peasantry in the world. Tea, bread, cabbage and occasionally potatoes, is their staple food, yet do the "educated classes" believe that in the Tropics the natives live on rice, whilst the "roast beef of Old England" for adults and milk for young people is the staple diet of all and sundry in the British Isles. Two-thirds of the rural population in England now-a-days taste beef perhaps once a month, and have milk, if at all, only in teaspoonfuls with tea.

This is not the place to expatiate on a people thus

placed; I have dealt with that elsewhere. The physical decline of a people with its rural population insufficiently and inappropriately fed is not far off.

Beef and Mutton.—It many parts of the Tropics fresh beef and mutton are unobtainable. Cattle may not be reared in the district, and imported cattle are usually employed as beasts of burden.

In out-of-the-way parts of the Tropics beef is wholly unobtainable; the population may be too small to consume, or too poor (as in many rural parts of Britain) to buy, sufficient of a freshly killed ox to make it pay to do so; this obtains not only in the Tropics, however, but in rural districts in Britain; so the "travellers' tales" on these points, although they amuse towns' folk in England, are true not only abroad but at home.

In the equatorial and the tropical zones north of the equator the consumption of beef by the natives is almost nil, and in the sub-tropical and northern regions it is seldom used. In southern sub-tropical countries—Australia, the Cape and South America, cattle grow and flourish, and the consumption of fresh meat, by Europeans especially, is as customary as amongst the better off classes in Britain.

Sheep are distributed very irregularly over the world, for in many parts it is impossible for sheep to live. It is not climate so much as food that is the determining factor, for in Southern China and in Japan where there are no sheep, it is the pasturage that is wanting. Fresh mutton and beef, therefore, is difficult to get in many parts, mainly owing to the environment being unsuited to the rearing and feeding of cattle and sheep, and partly from the inability of the people to buy imported meat.

Breeds of Cattle and Sheep.—It must be remembered that cattle are utilised very largely, not only in tropical but in some temperate countries, as beasts of burden. There are milk cows and draught oxen in the country it may be, but these are neither by a breed nor on account of their age when killed of a quality that produces wholesome and nutritious meat. In Britain, cattle are fed and killed at about two years of age, and from these and these only can the best beef be obtained; in most other European countries the breed of cattle is of inferior quality and do not reach a profitable killing age until one or two years later, necessitating thereby longer keep, that is, more expense and a higher charge for beef were they killed. The consequence is the farmer cannot afford to keep oxen for four years earning nothing, so he puts them to the plough and their muscles become so tough that their beef is leathery and affords but little nutriment.

It comes about, therefore, that cattle are either killed (except in Britain) as calves or allowed to reach the advanced age of ten or twelve or more years before being killed.

The reason that veal is used so commonly in France and Germany is attributable to this cause. Farmers cannot afford to allow the animal to attain full growth for market purposes as they have not the breed of cattle, nor have they the pasturage, turnips, &c., necessary to produce the highest class beef. Their animals when allowed to mature are utilised for

farm work, and when killed their muscles are so tough that the beef requires all the tricks of the culinary art to render it fit for consumption. Hence the superiority of "continental" cooks compared with British cooks; the former find it necessary to disguise the poor quality of the meat, the latter are not ashamed to produce the beef as it is, culinary tricks being unnecessary.

The quality of mutton depends greatly on the breed of the sheep. In Australia the wool-producing sheep are more sought after than are the flesh-producing sheep grown in Britain. The quality of mutton, obtainable from sheep from which wool is most profitably grown, is quite inferior to the class bred and fed for killing purposes; and as the farmer keeps the wool-producing animal for as many years as possible, it comes about that, not only from the quality point of view, but also from that of the age of the animals when killed is the mutton inferior in nutriment. It is plain therefore, that beef and mutton may be good enough from the inspector's point of view, but may be tough to digest and wanting in nutritious properties. Such flesh appeases hunger, no doubt, but is not calculated to give bulk for bulk the same nutrition as a food. In this way many dietary peculiarities of tropical life may be explained. More meat has to be eaten to get the sustenance necessary when the meat is of inferior quality. This may be the reason for the accusation made against Europeans dwelling in the Tropics that they eat too much. Certain it is that most Europeans eat more meat (when they can get it) in the Tropics than at home. Some say it is because the climate is exhausting and more strengthening food is required; but the real reason, no doubt, is that the nutritive quality of the beef and mutton is inferior, and that more has to be taken to supply the bodily wants, thereby taxing the digestive organs, which in hot climates are usually feeble, and bringing a train of gastric, hepatic and intestinal troubles.

Frozen Meat.—Could frozen mutton be introduced into tropical countries, a great food problem would be solved. In large cities on the coast cold storage would allow of a plentiful supply of mutton, and perhaps beef, being available for residents in the town itself, but in up-country districts the introduction of chilled or frozen meat is, in the present state of our knowledge, impossible. Not that the sheep of Australia or New Zealand affords the highest quality of mutton, for they are chiefly reared for the wool they produce, and the carcass has, up to recent years, been a bye-product. Now, by freezing or chilling, the bye-product has a commercial value, although it never can be, from sheep of that breed, of the highest.

Fowls are generally distributed through the universe, and there are no parts of the world, so far as I know, where fowls cannot be found. The wide distribution of the fowl is an important factor in the spread of civilisation, for it is a question if Europeans could live in many of the out-of-the-way districts they do were it not that they can have eggs or fowls to eat. The nutritive value of chicken is relatively small, however, and is frequently difficult to digest; moreover the monotony of eating fowl day after day, and month after month, let the fowl be cooked in ever so many ways,

palls upon the appetite after a time, and digestion and nutrition suffer.

Curry, so largely used in tropical countries, is not only the staple form of diet of many natives, but is used also freely by the Europeans dwelling in warm countries. Rice is the basis of the dish, and with it is a congeries of materials, which may consist of fish, flesh, or fowl, with vegetable additions of sorts. The sauce (curry really means sauce, from the Tamil word *kari*) is composed of condiments varying in potency; ginger, pepper (white, black, or cayenne), and various spices give flavour and "nip" to the meal. The use of pepper is, of course, an Oriental custom, and the stronger forms of pepper seem requisite as an article of diet. The therapeutic use of pepper seems to be not so much a stomachic tonic as an intestinal stimulant, and chiefly as a stimulant to the large intestine. It is the large intestine that first flags in its duty in the case of the natives of tropical countries. Constipation is one of their chief complaints, and the atonic condition of the colon is the chief cause. Black pepper is a stimulant to the colon and rectum, and its extensive use in warm climates is physiologically justified by what has been proved by therapeutic investigation and the experience of centuries. Constipation is combated by the natives of warm climates by pepper and spices in the food, by castor oil occasionally, and largely by the position assumed during defæcation—the natural or squatting position. Our modern closet with its high seat is a great detriment to defæcation, especially in habitual constipation, and were people thus afflicted to resume the "natural" position a great deal of the suffering due to piles would be prevented. Some people overcome the difficulty by standing on the seat—an awkward and an indelicate proceeding. The use of a high stool for the feet in front of the closet seat will really give a position sufficiently "squatting" to overcome the difficulty. Curry, therefore, if properly made, is an hygienic dish of value; and should not be regarded with the suspicion it is looked upon in Britain, where badly cooked rice, particles of tough, twice-cooked meat left over from a three or four days' old joint, and made hot to blistering strength with curry powder is the rule. The rice and meat should be served in separate dishes and the condiments added by the consumer himself, or herself, at table, and not by the cook. According to the state of one's digestion so may condiments be added, the people with atonic intestines requiring a larger helping.

THE BASIS OF SPECIAL PREPARATIONS.

It is impossible to deal categorically with each individual article issued by any particular firm. After all, it is the firm—the people who make the articles for consumption—to whom we have to look for protection in this matter. The show preparations of one firm may be as good as another, but the ordinary articles made to sell may be of quite another character. Given a firm that "can afford to be honest," and we have sufficient guarantee that the goods are what they pretend to be. Mistakes may be made, and faulty raw material may occasionally find its way into the manufactory, but in a firm with a good name to main-

tain, and not to lose, the public can rely that the materials employed are the best that can be obtained. Lately the American canned goods scandals have shaken the confidence of the public in all kinds of preserved foods. What was going on in American canning factories was well known to manufacturers of food products in this country, to all medical men, and to all who cared to listen to what was said and written. The warnings were disregarded, and British manufacturers were eclipsed in the market; now, perhaps, people will patronise the products of their own countrymen, where the materials used can be inspected, and the process of preparation watched. That British producers of foods of this description have taken infinite pains to ensure cleanliness of premises and wholesomeness of materials, is well known, and we look forward to still further improvement in this important department of food supply.

The basis, the "granulated powder," used by several manufacturers in this country is professedly obtained from America. This, perhaps, is commercially imperative, for it is impossible at the present price of beef-teas, essences, jellies, &c., in the market, that prime beef can be used in their manufacture. The "ox in a bottle" theory is all very well in the form of an advertisement to induce the public to buy the goods, but oxen in this country are not obtained for a few shillings, nor yet for a few pounds. An "ox in a bottle" would cost at least £25 instead of about as many pence at which it is sold. We would urge on manufacturers not to be afraid of price; beef is an expensive commodity, and its issue in the form of concentrated food will almost double its value, so that it is, and it must ever remain, expensive. The products at present in the market are much too cheap to command the serious attention of medical men, and we can assure the manufacturers that they will gain higher commendations from the medical profession upon their products, when they issue them at a price which even the most embryonic of financiers can appreciate to be necessary if the "basis" of the materials is obtained from the best beef.

Alcohol.—The natives of warm climates, both by their religion and their habits, shun alcohol. It is in no sense a food, and Europeans in the tropical countries would do well to avoid its use altogether.

Spirits and beer in hot, moist climates are positively detrimental to health; light wines, white or red, do least harm. Champagne, taken after excessive fatigue, about sunset, is perhaps the safest form of alcoholic beverage. It should not be taken with meals, but only on reaching home after a fatiguing march, or long exposure to wet.

Tea.—As a stomachic tonic, and as a safe way of introducing fluid to the system, tea would seem beneficial and hygienic. It was evidently introduced by the Chinese, owing to the calamities arising from drinking unboiled water. Deep well water is almost unknown in China, and the shallow wells and streams are so apt to become polluted, owing to the habits of the Chinese, that experience dictated the necessity of boiling the water. But, boiled water being insipid, and the object of its being boiled not being evident to ignorant and thoughtless people, the water was

"flavoured" by the leaves of the tea plant, a custom which has become widespread. It was, no doubt, for hygienic purposes tea was introduced, but the abuse of tea-drinking has brought many evils in its train. The Chinese drink tea after finishing their principal meal, and, in fact, as a drink at any time. They do not drink tea during their meal, but after the meal is finished. The pernicious system of drinking tea during a meal is one peculiar to British folk, and the habit is fraught with many dyspeptic troubles. The best China tea, prepared by pouring boiling water over the leaves and immediately pouring the water off the leaves, is a wholesome fluid, calculated to aid digestion, especially when taken after the meal is finished. Tea taken *with* animal food, be it eggs, fish, flesh or fowl, is a certain means of producing dyspepsia, for when the tea is "drawn" for a long time, and when the tea used is of an inferior quality—the method and material usual in Britain and Australia—the tannic acid of the decoction, uniting with the albumen of the animal tissues, produces a leathery compound which no gastric juice, however potent, can penetrate and digest. Tea used as the Chinese use it is a hygienic drink; as it is usually used in Britain and by British folk throughout the Empire it is detrimental to the public health.

Coffee.—Two or three mouthfuls of good coffee after a meal is an aid to digestion; taken in quantity, breakfast cupfuls, it is an impediment to digestion, and diluted with half milk and taken with a meal of eggs, fish, fowl, or flesh, is still more so.

Tobacco.—In moderation, and smoked soon after a meal, the deleterious effects of tobacco are infinitesimal. When indulged in to excess, say six to eight cigars, or fifteen to twenty cigarettes, or 1 oz. of pipe tobacco a day, especially in a moist, tropical climate, tobacco is an injurious cardiac depressant.

SPECIAL FOOD PREPARATIONS.

Beef Teas and Jellies; Chicken Soups and Jellies; Calves-foot Jelly.—Home-made beef-tea made from prime beef (top of the round) has the advantage that "we know what is in it." That, however, does not prove it to have nourishing properties. In fact, except as a stimulant from the salts it contains, it gives but a meagre nutriment to the system. Home-made beef essence is usually given in so concentrated a form that it frequently causes flatulence and discomfort. Of the many fluid beef extracts on the market, Bovril has for some time held the foremost place in popularity. It is used in the kitchen and in the sick-room; by the busy man of commerce and by the lounge in the club; by the soldier, the sailor, and the traveller, and in many remote parts of the earth it is highly prized. Whatever the nutrient value of Bovril, and other preparations of the kind, there can be no doubt they have contributed to advance temperance; for at public bars nowadays one of them is asked for instead of spirits or other alcoholic drinks. Tropical climates

do not affect Bovril so long as it remains undiluted. Brand's Essence has long held a high place in public estimation, and is a favourite preparation in the sick-room. "Lemco" is the name recently adopted by the purveyors of the well-known Liebig extract for their preparation. All the world knew the famous extract prepared by Baron Liebig, but although the name has changed we are bound to say the quality of the preparation has not deteriorated. The extract is as good to day as ever it was.

Chichester Brand preparations have been for a considerable number of years on the market, and they are not so widely known as they might and deserve to be. Shippam, of Chichester, manufactures these products, and those we have tried—the beef-tea and chicken jelly—are excellent, appetising, and easily digested.

Maconochie's preparations are pleasant to look at, agreeable to taste, and leave a sensation of cleanliness of the palate, very different to the mawkishness and burnt-beefy flavour which hangs about the mouth after some of the similar preparations in the market. The calves-foot jelly is specially good, and is relished by children; it possesses the great advantage of being ready for use. The essence of beef is a wholesome preparation. Messrs. Maconochie have endeavoured, and with success, to supply a compressed meat tablet, under the name of Vitox. The tablet is pleasant to taste, satisfying and sustaining, and contains as much nourishment as it is possible to get into so small a bulk. There are other well-known preparations of similar nature to the above, and most people have a preference for this or that jelly, extract, or essence. An apparent drawback to all these "solidifying" preparations is that they become fluid in warm climates. This is not really a drawback, as the nourishment is there all the same, and it means sipping fluid instead of jelly, but if one prefers them in a solid state, they may be put on ice, if available, or hung in a draught away from sunlight, or lowered in baskets down a well, where it is usually sufficiently cool to solidify most jellies.

Children's Food.—Of the many special preparations for infants' food, it is impossible to deal with at length. Several have been before the public for many years, and there is no fault to find with the majority of such preparations. Amongst those to be specially commended are: Neaves' Food for Infants—a carefully prepared and wholly hygienic product. The foods prepared by Savory and Moore and by Allen and Hanbury's firms have the guarantee of the names of these well-known and respected firms. The fault to be found with firms supplying food for infants is, that the majority of them pretend that artificially prepared infants' foods can, or do, take the place of milk, either in natural (human) or unnatural (cow's) form. Of special preparations for invalids and delicate people, Plasmon and Sanatogen hold deservedly high places in the public estimation. The former has been for some time in the market; Sanatogen is a more recent production, but one which has in cases of intestinal ailments such as typhoid, dysentery and so on become a favourite.

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THE PUBLIC AND THE FOOD TRADE.

THE recent gruesome disclosures of the secrets of the Chicago packing houses must have come as a rude shock to most dwellers in the Tropics, as few such can have read the articles that flooded the papers without having forced on them the disagreeable conviction that they had already largely overdrawn their account on the peck of dirt which proverbial philosophy places to the credit of every child born into the world.

In all our tropical possessions the old stager learns to utilise the resources of his adopted home, while the "griffin" may be known by his lavish expenditure on tinned "Europe stores," but there always remains a point beyond which local resources fail to meet the requirements of our European *ménu*, and to meet which, even the most seasoned veteran is driven to consume imported luxuries.

It is seldom that one can long follow the columns of our Indian dailies without meeting with a case of what is usually reported as "degchi poisoning."

The *batterie de cuisine* of the Indian cook is made up usually of copper vessels, so named, which are periodically tinned, and the gastric disturbances that are reported under the above title are popularly supposed to be due to metallic poisoning.

Now that the reports of degchi poisoning are so numerous, it is not surprising that the public should be so much interested in the subject.

examination of the dejecta; and it is a curious circumstance that most of these outbreaks occur after big dinner parties; on which occasions tinned delicacies always figure largely, forming as they do the Anglo-Indian's fatted calf. They are, in fact, cases of ptomaine poisoning.

In India it is quite possible to live comfortably without ever touching preserved food, but in some of our other tropical dependencies this is far from being the case. Notably, in West Africa, where from the European point of view, local resources are so scanty as to leave the white population mainly dependent on preserved food.

It is practically impossible for the consumer to test the wholesomeness of articles preserved in tins, as the really dangerous changes are often imperceptible to the sense of taste, and do not result in the production of gases, so as to make the can convex at the ends, or "blown."

Food in an advanced stage of decomposition, such as that contained in a blown tin, is hardly likely to be eaten by any one, save under the compulsion of actual starvation, but, unfortunately, the consequences of eating the apparently sound articles may be far more serious than those which would result from eating the products of ordinary decompositions. It is now tolerably certain that scurvy is caused, not by want of certain vegetable acids, nor even by the lack of fresh food, in the ordinary sense of the word; but that it is due to the action of certain ptomaines which exist in a large proportion of preserved comestibles, such as salt beef, tinned goods, &c., and possibly even in stale grain.

The great Arctic explorer, Nansen, remarked with reference to an outbreak of scurvy among the men of a sledging party, who escaped starvation by utilising a store of provisions left, some years before, by some previous explorers, and who rejected the blown tins, that they would have been wiser to eat the obviously decomposed than the deceptively wholesome-tasting portions of the store, presumably under the assumption that the bacteria, which cause the subtle and dangerous changes, would be crowded out and exterminated, and their products destroyed, by those of ordinary decomposition.

Every Indian jail superintendent knows how hard it is to keep an Indian prison free from scurvy, in spite of most liberal rations of fresh vegetables, and of lime-juice. Now the only article of the prison diet which is preserved is the grain, which forms the bulk of the ration, and this is bought immediately after the harvest and stored, often in a very primitive manner, so that by the next harvest it is necessarily more or less stale. It would be interesting to ascertain if the incidence of scurvy in these institutions is seasonal.

Sponginess of the gums, such as is seen in Indian jail scurvy, is by no means uncommon among Europeans in West Africa, and it seems possible that this may be merely a manifestation of scurvy, the result of too much tinned food, and that such a condition may be an important factor in the low state of health so noticed in residents of these colonies, quite apart from attacks of fever and other obvious tropical maladies.

It is therefore sufficiently clear that an efficient Government inspection of all preserved provisions is a *desideratum* of Imperial importance, which intimately concerns the development of many of our tropical possessions.

But it is not in the comparatively small item of preserved provisions alone that the public health is threatened by the impurity of food supplies. Milk, bread, and all foodstuffs in which adulteration is possible, are manipulated in shameless fashion.

Nor is the country producer any better than the town distributor, for it is notorious that the conditions under which milk is collected on farms, and cattle slaughtered in private abattoirs are often in the last degree revolting.

The whole business of the production and handling of food is, in fact, conducted without the least regard to either decency or cleanliness. To give a single example: Nothing is commoner, even in the best parts of the West end of London, than to see vegetables exposed for sale outside greengrocers' shops in such a position that they are accessible to any passing dog, and the baskets and their contents are actually often deeply stained with canine urine.

If this be a matter so common as to attract the notice of the casual passer by, it can hardly be supposed that the proprietors of these highly priced establishments can be ignorant of the disgusting consequences of the method they adopt to attract attention to their goods, and yet they continue to expose their customers to the certainty of having their food polluted in a most filthy manner rather than lose the chance of sale that would be involved in keeping their commodities properly protected.

That commercial rectitude and the caution of the buyer ever sufficed to protect the public against dirt and adulteration is more than doubtful, but whatever may have been the case in the "good old times," it is sufficiently obvious that stringent Government regulation of all branches of the food trade is an urgent necessity of the present day.

Another matter which calls loudly for Governmental interference is the abuse of advertisement.

It most emphatically is not a "pardonable exaggeration" to state a few teaspoonfuls of brown extractives, smelling suggestively like "secotine," represent the nutritive constituents of a cow crammed into the space of a cup, for though most buyers probably take the bare statement with some grains of salt, it may be taken as certain that they would not buy the stuff were they not persuaded that the contents of the tiny pot represent an amount of nourishment that could not possibly be concentrated to a reasonable bulk by any of the ordinary operations of domestic cookery, and as such is not the case, it is indisputable that the sellers obtain the purchase-money by false pretences, against which the public have as great a right to protection as they have against the wiles of the thimble rigger.

It must be remembered that it is especially the poor who put the most implicit trust in these lying advertisements and it is often pitiable to see hard-pressed parents and their other children pinched, to scrape together the extortionate price for some well-high valueless meat extract, which they fondly hope

may rescue their sick child from the jaws of death: a half-crown for the amount of albumen contained in half of a penny egg!—not one whit more nutritious and far less appetising.

Not the least part of the evil is that the unfortunate victims of this system of fraudulent misrepresentation are so hypnotised by the emblazoned falsehoods that force themselves on their sight from every available wall and hoarding, that it is impossible to convince them of the uselessness of highly priced rubbish of the sort, and they will pinch themselves and defraud the butcher, baker and candlestick maker of their just dues, in order to obtain the coveted talisman, however strongly one may persuade them to the contrary.

It is as great a fraud to state that a teaspoonful of some or other concoction contains as much nourishment as a pound of beef-steak, as it is to substitute sand for sugar, and the public have as good a right to be protected against the one as the other fraud.

Were wilful misstatements of the sort dealt with as they should be by the public prosecutor, it is tolerably certain that in a very short time the trade in food specialities, which owe their popularity to nothing but advertisement and the gullibility of the public, would soon shrink to very modest dimensions, and it is hard to see why steps should not be taken to ensure so desirable an end.

AN ADDRESS

Delivered at the Opening of the Winter Session of the London School of Tropical Medicine, October, 1906.

By Colonel KENNETH MACLEOD, I.M.S., M.D., LL.D.
Honorary Physician to H.M. The King.

NEARLY three years ago, on December 7th, 1903, an address was delivered in this place by Sir Patrick Manson, whom I may without impropriety designate as the Brahma and Vishnu—the creator and sustainer—of the London School of Tropical Medicine. In that address Sir Patrick Manson described the origin, progress and prospects of the institution, and indicated its objects, achievements and requirements. The school, which was opened on October 3rd, 1899, had then completed the fourth year of its existence. An aggregate of 355 students had undergone instruction during thirteen sessions, and evidence was produced of good work accomplished in the hospital and school, and by many of its alumni who had utilised to advantage the lessons, theoretical and practical, which they had been taught.

During the three years which have elapsed since that address was delivered the school has continued to prosper. The aggregate of students who have attended during twenty-one sessions has increased to 617. Of this number 235 belonged to the Colonial Medical Service, for whose benefit and for the benefit of the colonies in which its members were destined to serve, the school was originally designed and organised, under the administration and personal initiative of that great Colonial Minister, the Right Honourable Joseph Chamberlain; 18 medical men employed by the Foreign Office, 29 officers of the Indian Medical Service, seven of the Royal Army Medical Corps, four

of the Royal Naval Medical Service, one of the Indian Civil Veterinary Department, and 33 medical officers serving under other governments passed through the School, making a total of 327, or 53 per cent. of the whole; 71 medical missionaries and 219 private students, or 290 non-officials (47 per cent.), availed themselves of the opportunities of studying tropical diseases afforded by the school. The large proportion of non-official students fully confirms the wisdom of the founders of the school in extending its benefits to all medical men, and I may add women (for the aggregate includes 40 ladies) interested in tropical diseases and mostly intending to practise in the Tropics.

The demand for admission into the school has been well maintained, and the number of entries for the present session has been, I learn, unprecedentedly large. A specially satisfactory feature in the statistics of attendance is that the number of students taking the full course of three months is on the increase. The status of the school has been strengthened by its affiliation with the University of London and the admission of tropical medicine as a sixth alternative subject for the M.D. of that University. The school course has also been recognised as entitling students to undergo examination for the Cambridge Diploma of Tropical Medicine and Hygiene. Thirty-two students of the school have succeeded in obtaining this diploma, and one student has gained the London M.D., taking tropical medicine as the optional subject. Special arrangements have been made for instruction with reference to the examination for the London Degree and Cambridge diploma. The rich experience of tropical and other diseases available in the Dreadnought Hospital has been placed at the disposal of medical graduates by the establishment of the London School of Clinical Medicine, and the services of eminent physicians and surgeons have been secured for imparting instruction in the institution.

Of the transformation which has taken place of a branch hospital into a well-equipped medical school, I have had opportunities of personal knowledge. Some twelve years ago I paid several visits to the Royal Victoria and Albert Docks' Branch of the Seamen's Hospital Society. About 20 patients were accommodated in the rooms of a small building. The patients whom I saw were seamen of many nationalities, who had been admitted from vessels trading with the Tropics, and suffered from diseases contracted in warm climates. The arrangements for their comfort and cure were excellent. The place was occasionally visited by medical men interested in tropical pathology; but no means of systematic instruction existed. There was a small room in which microscopic and bacteriological observations were made and demonstrations given of malarial and other parasites; but the work was necessarily limited to the clinical needs of the Hospital. Recently, under the guidance of Sir Patrick Manson, I visited this Institution—Hospital and School—as it now exists. The Hospital has been enlarged and can accommodate 50 patients. The new wards are spacious, clean and well ventilated, fitted with every appliance and supplied with every requisite for the treatment of the sick. The School building adjoining the Hospital, with its large and well-stocked laboratory, lecture room, museum, and library, is well

adapted and provided for the instruction of 40 students; and, in addition to accommodation for the staff, provides quarters for 12 students, who are thus enabled to devote the whole of their time to their studies and practical work. The arrangements are well suited to their purpose and reflect credit on all concerned; but they are by no means complete, and the School must be looked upon as in a state of adolescence and immaturity. Effort and money are still necessary to enable it to accomplish all the good which its promoters and well-wishers desire.

It is satisfactory to know that the expenses connected with construction and organisation have, through the liberality of the Seamen's Hospital Society and the public, been fully defrayed. Conspicuous in the roll of benefactors is the name of the Honourable Bomanji Dinshaw Petit, of Bombay, who contributed 100,000 rupees to the School. Mr. Petit is evidently endowed with the liberal disposition of his family. His cousin, Sir Dinshaw Manakji Petit, Bart., among other benefactions, founded a veterinary hospital in Bombay, and contributed a large sum for a similar purpose when the Bengal Veterinary College, in whose creation I was deeply interested and concerned, was established in the year 1892. It is also gratifying to learn that the London School of Tropical Medicine is free of debt and able to pay its way; but in order thoroughly to fulfil its twofold object of education and research, the School needs further extension and development. The laboratory is not large enough for present requirements; additions are necessary for special purposes; with the exception of the Cragg's Scholarship no provision has been made for promoting and supporting research where it can most profitably be carried out, namely, in the Tropics; adequate remuneration is not given to lecturers and instructors, and the fees payable by students are high and capable of considerable reduction.

For these and other purposes more money is wanted. Sir Patrick Manson, in the address to which I have referred, estimated that £100,000 were required to place the School on a satisfactory and permanent basis. I understand that of this sum about £40,000 has been received. The remaining £60,000 would form an endowment which would expand the operations and enhance the usefulness of the School. Surely the wealthiest city and busiest port in the world may reasonably be expected, when the want is known, to contribute handsomely to the support of an institution whose work is designed to mitigate the loss of health and life, which interferes so greatly with the industry and commerce of our tropical colonies and dependencies, and causes such a waste of time, labour and money. The wealth of London and of England is largely drawn from the colonies and from the carrying trade connected with them; and any agency or institution which ministers to the promotion of health and prolongation of life, and thereby cheapens production, barter and transport, is deserving of encouragement and support. So that motives of benevolence and self interest combine to advocate the claims of the School to such liberal endowment, as to make it worthy of the city and country, and thoroughly competent to carry out those objects and operations whose aim is to benefit humanity and promote civilisation.

The necessity of special instruction in the diseases of tropical countries does not require argument or proof. As these countries have their peculiar flora and fauna, of which no general teaching of botany and zoology or special study of the plants and animals of temperate regions can supply a knowledge, so there are in the Tropics special manifestations and modifications of disease regarding which pathology and nosology, as taught in the medical schools of this country, afford very little information. The analogy is by no means a strained one, for the pathology of the present day is largely concerned with botany and zoology, and includes a study of vegetable and animal life. This fact has been widely recognised in the scheme of instruction arranged in this school. Through the liberality of the colonies the subjects of protozoology and helminthology have been added to the curriculum of study—a novel and important departure which merits commendation and imitation. The study of vegetable microbes is included in that of the diseases with which they are associated; but to complete the teaching of parasitology there is one subject which ought to be systematically developed, namely, pathological entomology. Insects, more especially blood-sucking insects, the mosquito and tsetse-fly for example, have been found to fulfil an important function in the conveyance of infective disease, and the harbouring and transmission of disease germs, and knowledge on this subject imperatively claims to be imparted and extended. Recent observations indicate that leprosy is spread by insect agency, and cholera, enteric fever, and plague are very probably similarly transmitted; but on these and other cognate points additional light is required. I trust, therefore, that a pathological entomologist will, in the early future, be added to the staff of the school.

The trend of modern investigation and thought has forced into the forefront the fascinating subject of comparative pathology, which has followed naturally but somewhat tardily on comparative anatomy and physiology. The researches of recent years, conspicuously as regards tropical diseases, have revealed a community of suffering and a reciprocity of infection and protection between man and the lower animal creation which have invested medical science with fresh interest and endowed it with larger power. In this connection it is pleasing to note that an agreement has been concluded between the London School of Tropical Medicine and the Royal Veterinary College, Camden Town, by which students of either institution may attend the other; and an interchange of demonstrations has been arranged. The inquiries and experiments which have made comparative pathology what it is, have been beneficial to both man and beast, and are capable of becoming more so—a point which is strangely overlooked by those who, from laudable but short-sighted motives, decry some of the methods by which our knowledge of influences, disabling and destructive, affecting animal life, is advanced. Physiologists and pathologists have been accused of callous selfishness and cruelty in subjecting the lower animals to experiment for the purpose of furthering medical science and improving medical art; but in investigating tropical diseases, men have, themselves, in numerous instances, incurred risks to health and life without

hesitation. The true causation of yellow fever was discovered through the agency of volunteers who readily subjected themselves to dangerous hazards in disproving the old doctrine of infection by fomites, and proving the fact of communication by mosquitoes. In working out the problem of malaria, human experiment has also been largely resorted to, as in the two crucial tests which were applied by members of this School. In 1900, Drs. Sambon and Low braved the perils of the Roman Campagna during the fever season, and by protecting themselves from mosquito bites escaped the maladies which prostrated the unprotected inhabitants of that malarious tract; and in the same year Patrick Thurburn Manson and George Warren contracted ague in London by allowing themselves to be bitten by mosquitoes which had been fed in Rome on plasmodium-infected blood. Similar risks, fatal in some instances, have been run, in investigating Malta fever, cholera and plague, and among recent medical martyrs the names of Lazear, Myers, Dutton and Tulloch, deserve special and regretful record. The study of comparative pathology is peculiarly needful in the Tropics where, under a different environment, life, and conspicuously parasitic life, is more exuberant than in temperate regions, and the struggle between the higher and the lower life, between the things and forces that make for development and construction, and those that make for decadence and destruction, is more keen and stringent.

The facts and laws of comparative pathology lead up to the higher reaches of transcendental biology and furnish new illustrations of the law of survival of the fittest, which the genius of Darwin formularised, and his industry so amply exemplified and established. It is important to note, however, that in this struggle the issue depends on circumstances and conditions, and is fortunately subject to the dominance of mind. The survival is not necessarily of the higher organism. In a state of uncontrolled nature the parasite is apt to obtain the mastery, the lower life to flourish at the expense of the higher; and this is specially true of the Tropics, with their luxuriant vegetation and teeming animal life. There the lower life is rampant, and the higher heavily handicapped in the contest. But when the earth is, according to the divine command, subdued for the use of man, when the primeval forest is cleared, the swamp drained, the desert irrigated, when crops serviceable to man are cultivated, and native races trained to agriculture and commerce, educated and civilised; when ignorance, poverty and filth are diminished or abolished, the parasite is at a disadvantage, physique and health are improved and life is prolonged.

The salutary effect of drainage, cultivation and cleansing, is well illustrated by the banishment of malarial disease from England. Epidemics of dysentery, which used to rage from time to time, are no longer heard of; typhus and relapsing fevers are seldom met with; plague and leprosy have receded eastward, and cholera has latterly been held at bay. In India there has also been a marked improvement in public health in consequence of undertakings such as railways, canals, waterworks and drains, which were appreciatively referred to by the Right Hon. John Morley, in his recent speech in the House of Commons.

I could, did time permit, cite numerous instances of the abatement of the incidence and mortality of fevers and fluxes in Indian towns by means of sanitary reforms, particularly vaccination, the supply of pure water and improved drainage and conservancy. I see no reason why health should be worse and life shorter in tropical than in temperate latitudes, when the conditions which affect vitality and longevity are properly understood and made the subject of proper control. In a word, what is required in the Tropics for healthy existence is reclamation—economic and sanitary—and these should go hand in hand. To this end the efforts of the whole community, not of medical men and sanitarians only, but of every member of the population, are required, and sanitary education should be made universal and compulsory. As a step in this direction, I am glad to learn that Sir Patrick Manson is preparing a catechism of tropical hygiene which he proposes to place in the hands of persons proceeding to the Tropics, and make the subject of examination as a condition of service.

The marvellous progress which has taken place during the last quarter of a century in our knowledge of the nature and causation of disease, to which the study of tropical diseases has so materially contributed, has radically revolutionised our notions regarding pathological processes. We have been compelled to widen our view and to devote more attention to the environment. Important as is the study of the host and his environment, hardly less important is that of the parasite and its environment. It is essential now that the life history of both should be worked out, and the conditions affecting both beneficially or prejudicially. Disease is no longer looked upon as a malignant entity, but as a mode of salutary resistance to noxæ; and such processes as fever and inflammation are found to be protective and curative in their purpose and effects rather than of themselves deleterious. This view proclaims the supreme importance of the study of the noxæ, as well as of the disturbances of health and function to which they give rise. The matter assumes an intenser interest when we consider that there exist in the animal body, materials whose office it is to destroy the noxæ—to kill the microbe and antagonise the poison elaborated by it. The existence of these materials and of their power, constitutes a startling instance of that adapted prevision commonly called design, which pervades nature, and whose most subtle and conspicuous manifestation is in the working of the human brain. To develop and strengthen these resistive and curative elements in the animal organisation, is one of the chief, if not the chief, object of medical science; and—greatest marvel of all—we are learning to use pathogenetic micro-organisms for this purpose, just as in the septic tank system we are employing saprophytic microbes to hasten the return of matter which has ministered to organic life, to inorganic forms, and thus to accelerate the process of decomposition, the intermediate products of which are so apt to be dangerous to health. The preparation of protective and curative vaccines and sera is engaging the attention of our most able and advanced pathologists. Even cancer, which seems to belong to the category of the infective granulomata, is being diligently experimented on from this point of view,

with results which offer some promise of eventual success. The principle which underlies the great discovery of Jenner, is, after the lapse of over a century, obtaining new and remarkable applications; the familiar formulæ, *vis conservatrix nature* and *vis medicatrix nature*, are undergoing incarnation, and the intuitions of our forefathers are being converted into material facts.

In offering these observations I have, I fear, been wandering among the hazy heights of generalities; but on an occasion such as the present it seems fitting to survey the field of work as a whole—its extent, condition and capabilities—rather than examine minutely the tilth of some particular portion of it. Generalisation is a delightful exercise, and speculation, or, as Tyndall phrased it, the scientific use of the imagination, is capable, when rightly and cautiously employed, of guiding and aiding enquiry. If we can find "tongues in trees, books in the running brooks, and sermons in stones," we may reasonably expect to discover philosophy in epiphytes, wisdom in worms, and, I may add, "good in everything." But the process of generalisation is prone to become, when misused, both misleading and unproductive and is apt to be beguiling. It is so much easier to think out than to work out a problem. No better illustration of this has ever been furnished than in that land of ideals and shams—India. The genius of James Lumsdaine Bryden, in the early sixties, sought to extract pathology and etiology from arithmetical units and aggregates of units; and strange doctrines concerning pandemic waves, aerial conduction and convection, and forces cosmic, telluric and climatic, became rampant. It is fair, however, to Bryden's memory, to state that his chief achievement, the discovery of the great prevalence of enteric fever in the European Army of India, was based on an intelligent study and interpretation of cases and *post-mortem* examinations, recorded by medical officers. The *reductio ad absurdum* of Bryden's visionary views was accomplished by James Macnab Cunningham, who, with a logical Scotch mind, showed unwittingly how they led to scepticism and nihilism. But, ever since the arrival of the English in India, there have been men who investigated the diseases of the country by clinical methods. The names of Johnson, Twining, Annesley, Webb, Martin, Goodeve, Morehead, Chevers, Carter, Moore and Fayrer, merit remembrance. Their work possesses great value, but it was too exclusively devoted to the subject of disease and the environment was neglected. A new era of systematic, practical observation, was opened by the deputation of Timothy Lewis and David Douglas Cunningham, in the year 1870, to investigate cholera by the methods which they had learned in the Army Medical School, Netley, which was an early pioneer in the special study of tropical diseases, and in which, from first to last, clinical and practical systems of study were followed. It is education of this sort that has fitted men like Bruce, Ronald Ross, Leslie, Roberts, Leishman, and Donovan, to accomplish work which has revolutionised tropical medicine, and, under the stimulating influence of Professor (now Sir) Almroth Wright's instruction, numerous observers, among whom I may specify the names of Lamb, Rogers, Liston, Douglas,

Bannerman, Buchanan, Christophers, James, and Greig, are now engaged in fruitful researches in India. Lewis and Cunningham did excellent work in many directions; but the methods which have been instrumental in adding so materially to our knowledge, particularly staining, pure cultivation and animal experimentation, did not come into full use in their time. The Government of India has now responded to the demands of modern medical science, and has resolved to establish laboratories for clinical aid and pathological research throughout India. Many of these are already in existence and active operation. The Pasteur Institute, at Kasauli, has been converted into a central research laboratory, under the direction of Lieut.-Colonel Semple, another disciple of Wright's; the King Institute at Guindy, in Madras, under Lieut. Christophers, is fully fitted for vaccine bacteriological and pathological investigations; the plague research laboratory in Bombay, organised by Haffkine, and Hankin's laboratory at Agra, are available for all kinds of inquiries, and Lingard's laboratory at Muktesar is devoted to similar studies in veterinary pathology. Other institutions of the same kind are being established, and in time every large hospital in India will no doubt have its laboratory.

To those who are about to commence their studies in this school I offer hearty congratulations on the excellent opportunities they possess for fitting themselves for the responsible duties of their future career. My own experience enables me to bear thankful testimony to the priceless benefit which I derived during my twenty-six years' service in India, from the vivid pictures of tropical disease which Maclean presented to us at Netley, and the sound lessons conveyed to us in the lecture-room, wards and laboratory, regarding their prevention and treatment. Since the year 1865 our knowledge of tropical diseases and of the means by which they are most profitably investigated has undergone a startling advance. I realised this acutely when, in 1897, I was appointed to occupy the Chair of Military and Clinical Medicine, which Maclean had so ably filled; and so rapid did this advance continue to be that, during my eight years' tenure of that office, I found it necessary from term to term materially to alter my lectures—to modify, to cancel, and to add. You are fortunate in being inheritors of the great accession to our knowledge of tropical pathology and hygiene which recent years have brought. There is hardly a subject which has not undergone illumination. Malaria, cholera, plague, leprosy, yellow fever, Malta fever, filariasis, ankylostomiasis, trypanosomiasis, kala-azar,—to catalogue some brilliant examples—have been investigated with diligence and success. Their special causes have been demonstrated, and important indications for their prevention and treatment supplied. But great as have been the triumphs much work still remains to be done on these and other subjects. The more we know the more we want to know. As the circle of knowledge widens the horizon of ignorance also seems to extend. The etiology of dysentery is still very obscure, and the relation of its different forms to hepatic abscess; we are still in ignorance regarding the causation of beri-beri, sprue, dengue, epidemic dropsy, infantile biliary cirrhosis, and many of the infective granulomata; and the strange terms, *ponos*, *goundou* and *ainhum*, require pathogenic explanation.

Why is the native of India relatively immune to the infection of enteric fever? Why do dysentery and beri-beri break out in the lunatic asylums of temperate regions, while the general population remains exempt? What is the relation between hill diarrhoea and sprue, whose symptoms are almost identical; and between kala-azar and Delhi boil, which appear to be caused by the same micro-organism? Why is the embryo of *filaria nocturna* absent from the blood in elephantiasis, which appears in the great majority of cases to be caused by filarial infection? These are a few examples of problems which still await solution. This school has already sent forth many earnest and successful workers, among whom Low, Daniels, Castellani, Bentley, Wise, Balfour and Philip Ross, deserve special notice; and the inspiration and training which you will imbibe and undergo here will stimulate and qualify you to follow their footsteps. The assimilation of knowledge is very precious, but the acquisition of aptitude for increasing knowledge is much more so. But, while discovery and invention are objects of high and laudable ambition, few are gifted with the power of productive original research, and it is very remarkable how meagre are the really permanent contributions to science of even the most gifted. Still it is open to every one to aid in some manner and measure, however humble, in the building of the temple of medicine. Permit me finally to remind you that the main purpose of your lives, as practitioners of the art of medicine, as it is the prime motive and glory of your profession, is to promote the welfare of man, to prevent and cure disease, to relieve suffering and prolong life. In striving to accomplish these ends you will earn gratification and gratitude, even if you fail to gain fame or fortune.

A vote of thanks to Colonel Kenneth McLeod was proposed by Mr. Edmund Owen, F.R.C.S., and seconded by Sir Frederick Young, K.C.M.G.

Sir George Denton and Fleet Surgeon P. W. Bassett Smith, R.N., also spoke.

A large number of people were present, including Professor Blanchard and Dr. P. Joly, from Paris.

THE ANNUAL DINNER.

The London School of Tropical Medicine and the London School of Clinical Medicine held their annual dinner at the Hotel Cecil on October 8th, 1906. Sir Wm. Hood Treacher, K.C.M.G., occupied the chair.

Amongst those present were:—Prof. Blanchard, Paris; Inspector General H. M. Ellis, K.H.P., Medical Director General of the Navy; Surgeon General A. M. Branfoot, C.I.E., President of the Medical Board of the India Office; Col. Kenneth McLeod, I.M.S.; Sir William Bennett, K.C.V.O.; Sir Patrick Manson, K.C.M.G.; Sir Dyce Duckworth; Sir John McFadyean; Sir Francis Lovell, C.M.G., Dean, London School of Tropical Medicine; Commander G. Hodgkinson, R.N.; Fleet Surgeon P. W. Bassett-Smith, R.N.; Percival A. Nairne, Esq., Chairman of the Committee of Management, S.H.S.; H. J. Read, Esq., Colonial Office; J. H. Batty, Esq.; A. E. Aspinall, Esq.; E. R. Davson, Esq.; Prof. W. J. Simpson, Prof. R. T. Hewlett, Dr. F. H. Anderson, Dr. Oswald Baker, Dr. Robert Boxall, Dr. H. Burrows, Dr. C. C. Choyce, Dr. C. W. Daniels, Dr. J. Mackenzie Davidson, Dr. Andrew Duncan, Dr. W. Fox, Dr. J.

Galloway, Dr. Russell Howard, Dr. P. Joly (Ministry of Marine, Paris), Dr. A. Ernest Jones, Dr. T. D. Lister, Dr. G. C. Low, Dr. Stephen Mayou, Dr. Guthrie Rankin, Dr. L. W. Sambon, Dr. G. E. Waugh, Dr. Russell Wells, Mr. Malcolm Morris, Mr. James Cantlie, Mr. L. V. Cargill, Mr. K. W. Goadby, Mr. A. Lawrence, Mr. L. H. McGavin, Mr. P. Michelli (Secretary).

The following telegram was read from the Duke of Marlborough, who was to have taken the chair: "Much regret unable to preside at this evening's dinner. Trust that both branches of school may receive that public support and recognition which their untiring efforts and skill so richly deserve."

The toast of "The King" having been honoured,

The Chairman proposed the toast of "The London Schools of Tropical and Clinical Medicine." He said that during his service in the Eastern Tropics, extending over some thirty-three years, he had come across a number of doctors who had had the advantage of passing through the school, and he had always found them to be keen officials, devoted to their important work, kindly, hospitable and charitable. For a considerable time he had taken a keen interest in the London School, which owed its origin, in the year 1899, to that great Colonial Minister and Imperial statesman, Joseph Chamberlain, whose restoration to health and return to active political life men of all parties anxiously desired. He had done his best to support and encourage in every way the foundation of an institute for medical research in the Malay States, the idea of which emanated from the fertile brain of that distinguished Colonial administrator, Sir F. Swettenham. The London Tropical School had now a hospital with 50 beds, and there was accommodation in the laboratory for 40 students. Nearly all of these places were occupied, and it was evident that further accommodation would be necessary in the future. Altogether 617 students had passed through the school. The Tropical School, although its financial position was sound, he would remind them that it was essential that a capital sum should be obtained to form an endowment by which the teachers in the school be adequately paid and full facilities afforded for research.

The London School of Clinical Medicine, which was a new organisation, had been established for the purpose of supplying the increasing demand for post-graduate teaching in London. It was the aim of the Clinical School, with the aid of the Committee of the Seamen's Hospital Society, to provide in London such teaching as might compare with that of any other centre of education.

Sir Patrick Manson, in replying to the toast, said that not many years ago some wise men shook their heads over the London School of Tropical Medicine, and a great many unwise men spoke with contempt of it. The result, however, had certainly not justified the prognostication. At present the school was recognised by the University of London and by the Colleges of Physicians and of Surgeons as a *bond fide* and valuable teaching institution. Through their school important contributions had been made to the advance of medical science, all having more or less a bearing on human pathology and human disease.

Drs. Castellani, Leiper and Wenyon, had each con-

tributed during the past year important original observations, and many other old students of the school had added to our knowledge of tropical disease. Lack of funds prevented the school undertaking all that was desired and desirable in the elaboration of discoveries and observations; laboratories, and specially qualified men to work in them were imperative; and the equipment could not be considered complete until an entomologist was added to its strength.

Sir Dyce Duckworth responded to the toast of the London School of Clinical Medicine. He stated that this important post-graduate school was founded by the energy and enterprise of the Committee of the Seamen's Hospital, who had already laid the country under a deep debt of gratitude for the School of Tropical Medicine. It is to be hoped that the London School of Clinical Medicine will have a great future, and that everything the medical staff and teachers could do to develop the School would be carried out in a whole-hearted manner.

Professor W. J. Simpson proposed the toast of the orator of the day, "Colonel Kenneth Macleod." He stated that neither in India nor at Netley would Colonel Macleod's work be forgotten. He had retired after an honourable and distinguished career, and amongst the great men who had illuminated the Indian Medical Service, or who had filled the chair of Military Medicine at Netley, Colonel Macleod's name would occupy a foremost place.

Colonel Kenneth Macleod, in reply, said that the London School of Tropical Medicine was a great school, one that the country might be proud of, and the people throughout the Empire ought to be thankful for the beneficent work it had done and is doing.

Sir William Bennett proposed the toast of the "Visitors," and accorded a special welcome to Professor Blanchard, who at all times had shown so kindly a disposition towards the Tropical School.

Professor Blanchard (Paris), in reply, stated that the London School of Tropical Medicine had stimulated the teaching and investigation of tropical diseases in the British Empire, and set an example which was being followed by all civilised countries. In a brilliant speech Professor Blanchard congratulated the British Schools of Tropical Medicine upon their work.

Inspector-General Ellis, Director-General of the Medical Department of the Royal Navy, said that they were well aware of the enormous benefits they had received from the teaching of the Schools of Tropical Medicine in London and Liverpool.

Surgeon-General Branfoot, C.I.E., on behalf of the Indian Medical Service, said he was glad to see that officers of the Indian Service availed themselves whenever possible of the teaching of these great schools.

Mr. P. A. Nairne, Chairman of the Seamen's Hospital Society, proposed the toast of "The Chairman." Sir Wm. Treacher Hood was one of many Englishmen who had guided the destinies of the British Colonies to success, and amongst the great governors of our colonies the Chairman took a high place.

The Chairman, in acknowledging the toast, paid a well-deserved tribute to Mr. P. Michelli, the Secretary of the Seamen's Hospital.

List of Students at London School of Tropical Medicine, October 8th, 1906:—

Indian Medical Service.—Major R. H. Castor, M.R.C.S., L.R.C.P.; Major S. A. Harriss, M.B., C.M. (Edin.), M.R.C.S., L.R.C.P., D.P.H. (Camb.); Major J. B. Smith, M.B., B.A., M.Ch. (R.U.I.)

Colonial Service.—E. W. Graham, M.B., C.M. (Glasgow); H. W. Gush, M.B., Ch.B. (Edin.); F. I. M. Jupe, L.S.A.; H. McG. Newport, L.R.C.P. & S.; W. B. Orme, M.R.C.S., L.R.C.P.; P. H. Pereira, M.B. (Madras), 1905, M.R.C.S., L.R.C.P.; A. B. S. Powell, L.R.C.P. & S. (Edin.); C. C. Robinson, M.B. (Lond.), M.R.C.S., L.R.C.P.; R. F. Williams, M.B. (Camb.); W. J. Von Winckler, M.R.C.P., L.R.C.P., L.S.A. (Member Inner Temple, London).

United States Army.—Capt. J. M. Phalen, U.S. Army, M.D. (Univ. of Illinois).

Missionaries.—W. Cammack, M.D. (N.W. Univ., Chicago), and Mrs. W. Cammack, M.A., M.D. (State Univ., Iowa), American Board of Missions; C. F. Fothergill, M.R.C.S., L.R.C.P., M.B., B.C. (Camb.), B.A. (Camb.), Church Missionary Society; Hannes Heikinheimo, L.M., Helsingfors, Finland, Missionary; R. Howard, M.B., B.Ch. (Oxon), M.A., University Mission; G. F. Stooke, L.R.C.P. & S. (Edin.), L.F.P.S. (Glasgow), Church of Scotland Mission.

Private.—Otto Bluhme, M.D. (Havana); E. P. Caropoulos, M.D. (Athens); Miss B. Cunningham, M.B., Ch.B. (Edin.), L.M. (Dublin); A. MacDonald Dick, M.B., Ch.B. (Edin.); P. R. Egan, M.D. (Columbia, New York); T. Giordani, M.D. (Rome); J. G. F. Hosken, M.R.C.S., L.R.C.P.; Miss Mary Kidd, M.B. (Lond.); J. A. Knebel, M.D. (Utrecht and Amsterdam); E. J. Maxwell, B.A. (Camb.), M.B., B.C. (Camb.), M.R.C.S., L.R.C.P.; Miguel Paz, M.D. (Guatemala); H. B. G. Newham, M.R.C.S., L.R.C.P., D.P.H. (Camb.); A. H. Reid, M.B., C.M. (Edin.); P. M. Rennie, M.B., Ch.B. (Edin.); F. O. Stoehr, M.B. (Oxon); F. M. Suckling, M.B., Ch.M. (Sydney); K. Raman Tampi, B.A. (Madras), M.B., Ch.B. (Edin.); W. A. Trumper, M.R.C.S., L.R.C.P.; J. C. Venniker, M.D. (Durham), F.R.C.S.E., M.B., B.S., D.P.H. (Durham), M.R.C.S., L.R.C.P.; W. W. Woolliscroft, M.R.C.S., L.R.C.P.

Indian Medical Service 3, Colonial Service 10, United States Army 1, Missionaries 6, Private Students 20; Total 40.

Obituary.

COLONEL ALEXANDER CROMBIE, M.D., C.B.

IT is with the deepest sorrow and regret we announce the death of Colonel Crombie, C.B., late of the Indian Medical Service, and a member of the Advisory Committee of the JOURNAL OF TROPICAL MEDICINE. Although the obscure illness from which he suffered, and which confined him to bed for nearly two years, prepared his many friends for the end, yet his death came suddenly and unexpectedly, at a time when he was being taken abroad for the winter. He died at an hotel in Dover, on his way to the Continent. By Colonel Alexander Crombie's death, the profession loses one of its brightest ornaments. A clinician of the first order, he brought to bear on his work not only a keen intellect, ripened by a vast experience, but also an attractive personality, full of sympathy, generosity and kindness, which inspired confidence in those who consulted him, and endeared him to all

his friends. Born in Fife some sixty-one years ago, of a good family, his childhood was spent in the country, where the fields and hills and heather implanted a passion for poetry and flowers, which continued throughout his life, and made him a charming companion to his most intimate friends. After a distinguished career at Edinburgh University, he graduated with honours in 1867, and settled in practice near Berwick-on-Tweed. Later, however, he gave up practice and entered the Indian Medical Service, in which he soon distinguished himself, and was rewarded by being appointed successively to some of its more important civil-surgeoncies, such as those of Rangoon and Dacca. On his transference to Calcutta he became Surgeon-Superintendent of the European General Hospital, a position which not only placed him at the head of the most important hospital in Calcutta, but also brought with it a large consulting practice. He retained this position until he retired in 1898, and was appointed a member of the Medical Board at the India Office. It was in his capacity as a member of this Board that he was deputed to the Army Board to medically examine officers starting for and returning from the South African War, and it was for this service, which entailed an enormous amount of work, together with the good service he had done in India, that he was decorated with the Order of the Companion of the Bath. Gradually he was acquiring a large consulting practice in London in tropical diseases, and there is no doubt that if he had not been attacked by this untimely illness, the pain and suffering of which he endured with so much patience and fortitude, his special knowledge of tropical diseases would have given him one of the largest consulting practices in London. Colonel Crombie was lecturer on tropical diseases in the Middlesex Hospital, and also at the London School of Tropical Medicine. He was an excellent lecturer, and the loss which these schools have sustained is very great. His contributions to medical literature are particularly valuable, coming as they do from a keen and experienced observer. Among these may be mentioned his observations on the normal temperature of Europeans and natives in India, in which he showed that natives of India had a higher temperature than Europeans, and Europeans in India a higher temperature than Europeans in temperate climates. His paper on the unclassified fevers of the Tropics is also a memorable one, in that it foreshadowed much that has been since verified by microscopical research and discovery. Colonel Crombie leaves a widow, a son and two daughters to mourn his loss. Our deepest sympathy is with them in their sad bereavement.

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

NOTE ON A LEUCOCYTOZOON FOUND IN
MUS RATTUS IN THE PUNJAUB.

By Colonel J. R. ADIE, I.M.S.
Ferozepore, India.

Note.—By Major Ross, C.B., F.R.S., Professor of Tropical Medicine, University of Liverpool.

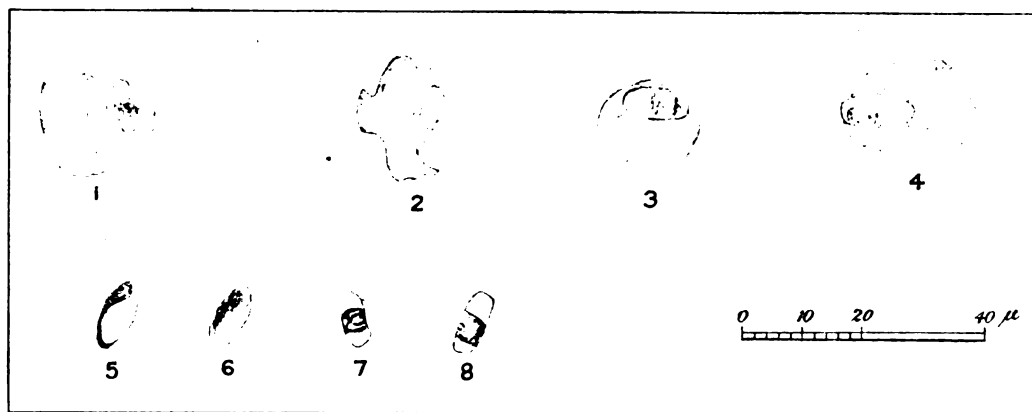
This report was handed to me by Colonel Adie, I.M.S., last July, for publication in the forthcoming number of the Thompson Yates and Johnston Laboratories' Reports. Owing, however, to the delay in this publication, I have not been able to give effect to Colonel Adie's wishes. I have now requested the Editor of the JOURNAL OF TROPICAL MEDICINE to publish the paper in view of the interesting article by Dr. Cleland in that journal for October 1st.

stained red dots, six to twelve in number, are seen in the neighbourhood of the nucleus, and, occasionally also at one end of the oval. In one specimen the entire protoplasm showed faint stippling.

The nucleus is peculiar. The shape is most often quadrilateral, with rounded angles. It occupies the whole, or nearly the whole, width of the cell, is situated rather nearer one end, and what is very striking, generally shows transverse striation. These striæ are not always parallel, but may appear as curious patterns. The above seems to be the appearance as seen on the flat. At other times, the nucleus is oval, or crescent-shaped, or obliquely pear-shaped; and this seems to be the side view.

The outline of the organism can be clearly made out, even when the nucleus of the leucocyte is quadrilateral, or annular, or approaching the polynuclear shape.

The length of this leucocytozoon is from 9.8 to 13 microns, and breadth from 5.2 to 6.5. The average



1, 2, 3, 4, show the parasite in the leucocyte. 5, 6, 7, 8, represent parasites with well-stained nuclei, showing the peculiar arrangement of the chromatin.

Last January, while engaged in examining the peripheral blood of a series of ordinary house rats (*Mus rattus*) in Ferozepore (Punjab), I came upon a film which showed something unusual—a parasite in a leucocyte.

I have not yet had an opportunity of studying this parasite in the fresh state, and the description which follows is derived from specimens met with in many films from more than one rat, the films being stained by the long Romanowsky method.

The appearance of an affected leucocyte is striking, and an observer cannot fail to have his attention drawn to it, even with a $\frac{2}{3}$ obj. and No. 4 E.P. In fact, by this combination, one can most easily recognise a specimen in the film.

The parasite is not, so far, found in all varieties of leucocytes, but only in those which might be classified, according to definition of terms, as transitionals and mononuclears.

Its shape is uniformly oval, and the nucleus well-defined. It appears to have a well-marked and well-stained cell wall. The protoplasm is either uncoloured, or sometimes shows a faint pink staining, especially

towards the periphery. Not infrequently, faintly dimensions are 11.7 by 5.6 microns. The nucleus, when quadrilateral, is about 5 or 6 microns square.

No pigment has been seen either in the parasite, or in the affected leucocyte. Only one free specimen has been met with.

In a series of thirty-nine rats examined, the leucocytozoon was met with in eight, or 20 per cent.; and in the same series, trypanosomes were found in sixteen, or 41 per cent. The leucocytozoon was found only in cases where trypanosomes were also found. In other words, half the rats harbouring trypanosomes were found to be harbouring the leucocytozoon. Roughly speaking, the numbers of the two parasites corresponded, that is, when trypanosomes were numerous, leucocytozoa were numerous; but in three cases, trypanosomes were very numerous and no leucocytozoa were found.

Through the kindness of Captain Liston, I.M.S., of Bombay, I have seen some of his preparations of spleen smears of rats, taken in the Punjab when he was investigating plague. He also noticed this leucocytozoon. In his stained smears the parasites look

oval, and the nucleus oval too. But I could not make out any particular nuclear structure. Nor is one able to say if the leucocytozoon has any relation to trypanosomes, as the latter are not common in rat spleen smears. The different appearance of the nucleus in Captain Liston's and my specimens may be accounted for by the manner of spreading; his being a spleen smear, and mine a blood film.

It has been noted that the parasite inhabits a particular kind of leucocyte—a large cell, whose nucleus is never seen round, and never multiple, with connecting strands. It is an oval, or an indented oval, or a ring, or it has an irregular shape. The protoplasm is hyaline. It is not easy to make a count of these films, as the greatly-varying shapes of nuclei make it difficult to classify the cells as polynuclear, or transitional, or mononuclear. There is also the difficulty of intermediate forms. It seems the rat, normally, has a greater number of transitionals and mononuclears, proportionally, than man; so that it becomes necessary to separate the transitionals in making counts.

The following table shows counts in rats' blood (a) without any parasites, (b) with many trypanosomes, and (c) with many trypanosomes and many leucocytozoa.

	a No parasites	b Trypanosomes only	c Trypanosomes and Leucocytozoa
Polynuclears ..	22.3	25.6	25.
Transitionals ..	17.	17.6	15.7
Mononuclears ..	14.5	21.6	7.7
Lymphocytes ..	44.4	32.6	51.
Eosinophiles ..	1.6	2.3	.6
Basophiles ..	.2	.3	.0

Bentley and James [1] have found a leucocytozoon in the dog in India. James states that it almost invariably invades the polynuclears. Some of his figures are of leucocytes, whose nuclei seem to point to the transitional type, but the protoplasm is depicted as granular. James's *Leucocytozoon bentleyi* is $10\frac{1}{2}$ by $5\frac{1}{4}$ microns. Its shape is not quite the same as this rat's parasite; it may be associated with filaria and piroplasma.

Christophers [2] describes a somewhat similar parasite, *Hæmogregarina gerbilli*, in the Indian field rat. It is partly curved on itself, and enlarges the red blood corpuscle from $5\frac{1}{2}$ to $6\frac{1}{2}$ microns to 10 by 7 microns.

Balfour [3] describes a hæmogregarine in the desert rat, Jerboa. It may be free, or in the remains of a red cell—size 5.6 to 7 by 1.4 to 2.8 microns. The free form is 3 red-cell-diameters long, and 2.8 microns wide. He states incidentally, "I have recently discovered what seems to be the same parasite in the mononuclears of the Norway rat (*Mus decumanus*) in Khartoum. It is probable it exists as a leucocytozoon in the rodents." From the figure of this latter, the parasite is seen to have a close resemblance to the Punjab specimen, and to inhabit a leucocyte which may be counted transitional or mononuclear.

Patton [4] has recently described a leucocytozoon in the mononuclears of the palm squirrel, both in the cells and free. He notes the large number of mononuclears in a film, but does not speak of transitionals. His leucocytozoon also shows a curled tail. Free forms are common, 13 to 14 microns by 3 to 4 microns. Intracellular forms measure 10 by 5 microns. Many leucocytes have two parasites. It would appear that trypanosomes are common in this specimen of squirrel, but no particular mention is made of any relationship.

If this parasite has been hitherto undescribed, I propose the name, *Leucocytozoon ratti*.

REFERENCES.

- [1] JAMES. *Scientific Memoirs*, Government of India, No. 14.
- [2] CHRISTOPHERS. *Scientific Memoirs*, Government of India, No. 18.
- [3] BALFOUR. "Hæmogregarine in Desert Rat," *JOURNAL OF TROPICAL MEDICINE*. August 15th, 1905.
- [4] PATTON. *Scientific Memoirs*, Government of India, No. 21.

OCCURRENCE AND HABITS OF SOME SPECIES OF HUMAN BITING FLIES BELONGING TO THE FAMILIES *TABANIDÆ* AND *MUSCIDÆ* (*GLOSSINÆ*), FROM THE WEST COAST OF AFRICA.

By G. C. DUDGEON, F.E.S.

(Superintendent of Agriculture for British West African Colonies and Protectorates.)

HAVING had the exceptional opportunity of visiting all the British West African Colonies and Protectorates during the present year, I think it probable that a few notes I made in connection with the habits of some of the biting flies found there, which attack human beings, may be of interest.

I shall make no reference to the *Culicidæ* (Mosquitos) or *Simulidæ*, but confine my remarks to the *Tabanidæ* (Horse flies) of the genera *Tabanus*, *Chrysops* and *Hæmatopota*, and to *Glossina* of the family *Muscidæ*.

The effects of the bites of these flies upon human beings are very different in severity, which point, I think calls for further investigation. It is recognised that among the *Glossina* the species *palpalis* conveys the *Trypanosoma* causing sleeping sickness, and that various other *Glossina* species in a like manner carry the parasite of the "fly disease" among cattle. In addition to this Mr. Austen now admits that there is evidence of species of *Tabanus* transmitting a disease among dromedaries in Algeria, which is also caused by a *Trypanosoma*.

I did not find that the natives in any part paid particular attention to the attacks of "tsetse" fly (*Glossina*), but in places a species of *Chrysops* was not so lightly regarded. Of this genus the one which is held in the greatest dread is a bright reddish coloured species, which had been placed, until the present, under the name of *C. dimidiatus* in the British Museum, but as my specimens included the true *C. dimidiatus* (v. d. Wulp), this red one has now to be called by a new name. As far as I was able to make

out this *Chrysops* n. sp. is known to the natives of the Calabar district under the name of "O-owe," but I did not ascertain the native name in the Warri province. Both *C. dimidiatus* and this new species were found commonly at Ologbo near Benin City. The latter species was first brought to my notice by Mr. Munro, Ex.-Engineer to S. Nigeria, when we were encamped at the last-mentioned place. The effects from a bite of *C. dimidiatus* were similar to a honey-bee's sting, causing a good deal of pain and inflammation, but from that of the red *Chrysops* even more severe with dropsical-like swelling of the limb and high temperature. My carriers appeared very much afraid of this insect and hastily dropped their loads when one came near in order to arm themselves with branches to ward off its attack; this they never troubled to do for other biting flies. Both species mentioned are somewhat similar to *Syrphidæ* (Hover flies) in appearance and, as they also hover round the person they intend to attack, their flight is not unlike that of these flies. The following are the localities where I met with them.

Chrysops dimidiatus (v. d. Wulp) Ologbo, Benin City (S. Nigeria).

Chrysops n. sp. Ologbo, Benin City, Sapele (Warri province); Odut, Uwet (Old Calabar province).

Hematopotas of two or three species occur commonly in the shaded paths throughout the West African Colonies, the most frequently met with being a dull black insect with mottled wings (my specimens of this have apparently become destroyed in transit). When travelling in a hammock this insect is often seen crawling slowly about the undersurface of the sun-protecting roof. The only example of the genus which I have preserved is one which was caught after having bitten a passenger upon a lower Niger steamer. Miss Ricardo has marked this "n. sp. near *Hematopota strigipennis*, Karsch." The bite does not appear to be serious in consequences.

Tabanus is a genus which is represented by a large number of well-marked species on the river Niger and tributaries as well as the other rivers along the coast. The approach of a *Tabanus* is made known by its loud buzzing, but the attack is not usually made by the insect at the point upon which it at first settles. In one case I witnessed *Tabanus testaceiventris* Macq. alight upon the back of a native at the wheel of a steam launch in which I was travelling, and, although it crawled over the man's bare flesh for some time, it did not attempt to bite until it had reached the outside of a vest which he wore, when it tried to drive its proboscis through the material in order to do so. The bites of all the species I met with, and which I had personal experience of, resulted in a painful swelling, which generally subsided in a few hours. The species which gave most trouble upon the creeks of S. Nigeria were *T. gabonensis*, *T. thoracicus* and *T. nigrohirtus*, while in N. Nigeria *T. teniola*, *T. fasciatus* and *T. testaceiventris* were most conspicuous. *T. biguttatus*, of which the male is differently marked to the female, I found upon three or four occasions in a verandah in Lokoja, but it never seemed inclined to bite, only crawling slowly about flowers or verandah posts. On two occasions I took specimens of *T. obscurissimus*, upon the ground,

having lost both wings. I can offer no explanation for this, although the coincidence seems rather remarkable. Some of the species of the genus are brightly coloured and the eyes of many in life are brilliant coppery green or blue. Below I give a list of the species obtained with notes concerning the colours of the eyes of some. I am much indebted to Mr. Austen, of the British Museum, and to Miss Ricardo, who is working at *Tabanidæ*, for the identifications of the specimens I collected, which will be placed in the National collection.

T. gabonensis Macq., Sapele, Odut, Ologbo (S. Nigeria).

T. testaceiventris, Macq., Ologbo (S. Nigeria): Niger River to Muraji (N. Nigeria).

T. nigrohirtus, Ricardo, Warri (S. Nigeria).

T. teniola, Macq., Egga, Lokoja (N. Nigeria). Eyes dull green.

T. subangustus n. sp. Ricardo, Odut (S. Nigeria).

T. n. sp. near nigrohirtus, Ricardo, Lower Niger (S. Nigeria).

T. obscurissimus, n. sp. Ricardo, Uwet (S. Nigeria).

T. thoracicus, Pal. Beauv., Ologbo, Lower Niger (S. Nigeria). Eyes emerald green.

T. fasciatus, Fabr., Baro (N. Nigeria). Eyes coppery green.

T. latipes, Macq., Niger and Kaduna Rivers (N. Nigeria). Eyes deep blue.

T. biguttatus, Wint., Lokoja (N. Nigeria). Eyes dark brown.

T. splendidissimus, Ricardo, Ologbo (S. Nigeria).

T. n. sp. Odut (S. Nigeria).

I first met with *Glossina palpalis* in the Gambia, upon the creeks in the Kominbo province. No flies were seen until we were actually in the mangrove belt and at the water side, when numbers appeared and settled upon our clothes and upon the sides of the canoe in which we travelled. The only animals seen near here were the pack donkeys used for conveying the ground nuts to the creeks for water transport. Although the place where *G. palpalis* was in numbers was not fifty yards from where the donkeys were unloaded, no tsetse flies were attracted to them. After taking off their heavy loads the drivers hammered the muscles of the legs of every animal and pulled the joints, whereupon the donkeys rolled on the grass for a short time and appeared much refreshed. A horse suffering from the fly disease and showing all the usual symptoms was seen at Bakau, where, while examining a swamp, a tsetse fly settled upon me. Unfortunately I did not manage to capture it. In the direction of Brufut large herds of cattle were seen, and, although there were swarms of flies about them, no tsetse were seen. All the cattle were in a healthy state, but were never permitted to go in the direction of the creeks, not very far distant. At York, S. Leone, while waiting for a canoe to cross a tidal creek, Mr. Smythe, Curator of the Botanic Gardens, who was with me, was bitten by *G. palpalis* and his hand swelled to a considerable size. Although I was subsequently bitten on several occasions by *G. palpalis* and *G. tachinoides* in N. Nigeria, no such symptoms appeared in my case. The flight of the unfed insect seems to be generally short and in the form of an upward curve, dropping suddenly near the settling

point; this gives it the appearance of striking the object heavily. I have only met with the two above-mentioned species on, or upon the immediate banks of, rivers and have never seen either feed, unless in shade. Instances of places where one is likely to be bitten by tsetse flies are: inside the trouser leg below the knee, where the fly will creep up to from the boot; inside the half closed hand, upon the palm; close to the hat brim on the forehead or behind the ear. I did not notice that *Glossina* were noisy, nor could I observe any motion of wings while feeding. The occurrence of *G. palpalis* was curiously alternated with that of *G. tachinoides* on some parts of the Niger. In the lower Niger, as far up as Iddah, an almost black form of *G. palpalis* is found, from Lokoja to Baro *G. tachinoides* occurs commonly, from Egga (a few miles beyond Baro) to Muraji (junction of Kaduna river) typical *G. palpalis*, and from Muraji up the Kaduna to Dakoma *G. tachinoides* again was the only species seen. Horses are the usual method of conveyance in N. Nigeria and so long as they are kept away from the rivers do not run the risk of the fly disease. *G. morsitans* was not seen by me in N. Nigeria, but I took it upon the Volta river at about half a mile distant from the water, as well as at a place six miles north of Kumassi towards Aguna, where there was no extent of water. I think that *G. morsitans* has different habits to those of *G. palpalis* and *G. tachinoides*, and may be found at some distance from large expanses of water. Cattle are not kept upon the Volta river, and although I met with some near the place where *G. morsitans* was taken north of Kumassi, I understand that these were being brought into that town for killing, from outside the forest belt in the north. The species taken with their localities are as under:—

G. palpalis, Rob. Desv., Gambia River, York (S. Leone), Kent (S. Leone), Warri, Old Calabar, Lower Niger as far as Iddah (S. Nigeria), Upper Niger, Egga to Muraji (N. Nigeria).

G. tachinoides, Westw., Upper Niger, Baro-Lokoja, Kaduna river, Muraji-Dakomba (N. Nigeria).

G. morsitans, Westw., Pesse, Volta River (Gold Coast); between Kumassi and Ekona (Ashanti); probably also Bakau (Gambia).

NOTES ON SOME OF THE MORE OBVIOUS DISEASE CONDITIONS SEEN ON THE LINE OF THE PROJECTED LOBITO-KATANGA RAILWAY.

By F. CREIGHTON WELLMAN, M.D.
Benquella, W. Africa.

THE writer has from time to time published in these columns notes and papers on the diseases found in this colony, chiefly in the districts of Bihé and Bailundo. The region referred to in the following remarks, however, has not been inspected before, and indeed, so far as I can learn, has never been up to this time visited by a medical man. The most of the observations here recorded were made among the Chiyaka tribe, about 150 miles east of Lobito Bay;

and are of necessity concerned mainly with those features which would strike the eye during a hasty survey of the country. It may be possible on some future occasion to present a more detailed study of the region, including results of microscopical examinations of the blood and excreta of series of the natives. The diseases mentioned are placed in alphabetical order.

Abscess of Spleen.—One case seen in which I opened and drained the abscess, the patient recovering very rapidly.

Albinism.—Two cases of complete albinism were noted.

Ainhum (see plate, fig. 9).—Two cases, neither of which showed any symptoms of leprosy.

Deformities.—Supernumerary fingers and toes were twice seen. Probably a better acquaintance with the region would reveal more, as I have seen many such cases in Africa. A case of "Siamese Twins" was reported to me, but I did not see the children personally.

Elephantiasis.—Pretty common among the blacks in the district. However, in my not large series of blood examinations I did not see embryos of *Filaria bancrofti*, although *perstans* was met several times, the man whose leg is shown in the fig. 10 (see plate) being a victim of the infection.

Epilepsy.—Very common. Many cases being brought to me for treatment, some of which showed scars from having fallen into the fire during fits.

Goitre.—Rare. Only one case seen. This region furnishes a marked contrast to the goitre-stricken areas in Bihé district.

Hernia.—Umbilical hernia is as amazingly common as in other parts of the colony. Inguinal hernia not rare. Half a dozen cases came asking for treatment.

Hypertrophy of the Breast in the Male.—A couple of cases seen. The natives are very anxious to have the growths removed, as these subject their possessors to much chaff and ridicule from their companions.

Jiggers.—*S. penetrans* as common as in other parts of the colony.

Keloids.—Common, as among all African blacks.

Leprosy (see plate, figs. 6, 7 and 8).—This disease is much commoner in the region visited than in Bihé and Bailundo districts, and severe cases of long standing were seen; leprosy is as yet comparatively rare in the districts just named.

Malaria and Blackwater Fever.—While I was not able to make in this region many blood examinations, yet both the sub-tertian and quartan parasites were seen. In looking over natives one gets the impression that the amount of malarial fever is about that seen in similar altitudes to the north. Cachexia from this cause (see plate, fig. 12) is about as common as in Bihé and Bailundo. It is interesting to note here that some thirty Boers died of blackwater fever last season at Capalla, a place formerly, I believe, considered to be quite healthy.

Myiasis.—While I saw no cases of this condition yet I took many specimens of *Sarcophaga africa*, *S. albobasculata* and *Anthomyia desjardensis*, all of which I have convicted of causing myiasis in this colony; besides many specimens of *Auchmeromyia luteola*, the habits of which are now so well known.



FIG. 1.



FIG. 6.



FIG. 10.

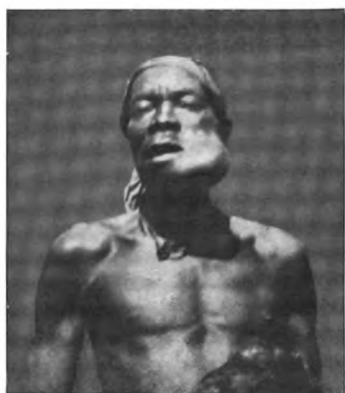


FIG. 2.



FIG. 7.



FIG. 11.



FIG. 3.



FIG. 8.



FIG. 12.



FIG. 4.



FIG. 9



FIG. 5.

To illustrate paper by F. CREIGHTON WELLMAN, M.D., "Notes on Some of the More Obvious Disease Conditions seen on the line of the projected Lobitokatanga Railway."

"*Ochimumusu*."—This is a marginal ulceration of the gums common in this colony and in other parts of Tropical Africa. I made the interesting discovery of spirochaetes in great numbers in the mouths of each of the several cases seen with the disease in the district under discussion. I failed to find the organism in control cases. I shall deal at length with these observations in a subsequent communication.

Sleeping Sickness and Tsetse Flies.—I am credibly informed that "fly" exists on the Kambanga, Sapa, and Solo rivers, east of Benguela along the proposed line of the railway, also on the Kuvale river and yet farther inland on the lower Cunene. The Boers state that the flies are worst about the middle of the rains (January to March), when buffalo are in the district. Although I have not yet had the opportunity of examining specimens, the fly is in all probability *Glossina palpalis wellmani* Austen, as this is the only tsetse yet found on the west coast south of the Coanza river. At Bimbash, a few hours east of Benguela, a gentleman connected with the railway informs me that nearly all the natives have died of sleeping sickness. I have elsewhere (*Journal of Hygiene*, July, 1906) discussed the probable fact that trypanosomiasis is rapidly spreading in the colony.

Tick Fever.—The "*Ochihopio*" (*Ornithodoros moubata*) abounds, as elsewhere, in Angola. Reports of natives and colonists here confirm my opinion elsewhere published that tick fever is commoner in the colony than it was a few years ago.

Tumours.—New growths of all varieties seem to be in the district, as elsewhere in this part of the world, fortunately rare. One striking case of tumour of the lower jaw was seen (see plate, figs. 1 and 2).

Ulcers.—These are commoner in the district than in any other region in West Africa known to me. Many of the cases of what the writer has called "subacute tropical phagedæna" go on until the underlying bones are attacked and disorganised (see plate, figs. 3, 4 and 5). In localities where such mild cases of elephantiasis as are shown in figs. 10 and 11 (see plate) are common, there were noticed large numbers of these subacute, deep-eating ulcers. Taken together with the apparent absence of *F. bancrofti* from the district, this fact suggests that the same bacterial infection may be responsible for both conditions.

Yaws.—Commoner than in Bibé and Bailundo. Spirochaetes were found in two cases; but, as the writer's investigations on this disease as it occurs in the colony are soon to be published in an official report, details need not be entered into at this time.

EXPLANATION OF PLATE.

FIGS. 1 and 2.—Tumour of the lower jaw.

FIGS. 3, 4, and 5.—Subacute Tropical Phagedæna. (Fig. 3, a case of long standing, resulting in necrosis and fracture of the tibia. The end of the bone may be seen in the lower part of the ulcer. Fig. 4, a typical sore on the shin, also with extensive bone necrosis. Fig. 5, a piece of bone removed from the latter).

FIGS. 6, 7, and 8.—Leprosy. (Fig. 6, a typical case with classical symptoms, *main-en-griffe* well shown in hands; characteristic lesions of feet, &c. Fig. 7, case with characteristic spots and patches on legs and abdomen; but these do not show well in the photograph. Fig. 8, feet of latter).

FIG. 9.—Ainhum.

FIGS. 10 and 11.—Elephantiasis of the legs; early stage.

FIG. 12.—Malaria Cachexia.

TWO CASES OF FRONTO-NASAL CEPHALOCELE.

By ALEXANDER ROBERTSON, M.B., C.M.

Gilbert Islands Protectorate.

TEN TEKONAPA, male, aged 2, admitted to Tarawa Hospital on account of tumour of the head.

Present State.—The patient is a hydrocephalic child, and does not exhibit any signs of intelligence. In the fronto-nasal region is a tumour about the size of a small rock melon, containing fluid. The weight of the tumour interferes greatly with the movements of the head, the child requiring to support the tumour in his hands. Lateral nystagmus is present in both eyes. Above the right ear, in the line of the fronto-parietal suture, is an irregular scar, an inch in length.

History.—The mother states that at birth there were two swellings, about the size of a hen's egg, on the child's head: one above the right ear, where the scar now is; the other at the root of the nose. The former burst a few months after birth; the latter gradually increased in size until it attained its present dimensions.

Operation.—Under chloroform, the skin was dissected from the tumour by means of an inverted T-shaped incision. A small aspirating needle was then introduced, and twelve ounces of clear cerebro-spinal fluid slowly drawn off. During the escape of the fluid there was no tendency to syncope, nor any appearance of blood in the exudate. Digital examination showed the absence of the glabella and the horizontal plate of the ethmoid, and marked separation of the nasal bones. The sac was then transfixed and ligatured close to the skull, and the distal portion removed. The skin incision was closed by interrupted catgut sutures. The child made an excellent recovery from the operation.

NEI NAUA, female, aged 10, admitted to Tarawa Hospital on account of tumour at root of nose.

Present State.—There is a cystic tumour in the fronto-nasal region about the size of a duck's egg. It is covered by skin, which is adherent, and contains some firm, elastic substance; no cerebral pulsation is detected in this mass.

Operation.—Under chloroform, a vertical incision was made over the tumour and the skin reflected. The cyst was then incised and examined. The wall was composed of fibrous tissue $\frac{1}{4}$ th of an inch thick, its inner surface being smooth and glistening. There was no cerebro-spinal fluid present. At the bottom of the cyst was a greyish mass, 2 ins. broad and $1\frac{1}{2}$ ins. thick, the outer portion firm and fibrous, the inner soft and compressible; deep pressure elicited a faint pulsation. In order to reduce the deformity as much as possible, I removed the outer portion of the mass in successive layers till I reached a point $\frac{1}{4}$ th of an inch from the opening in the skull, produced by the separation of the nasal bones and the absence of the glabella; the horizontal plate of the ethmoid, in this case, was also absent. The redundant sac and skin were then ablated, and the wound closed by catgut sutures. The wound healed by first intention.

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THE

Journal of Tropical Medicine

NOVEMBER 1, 1906.

A NEW ASPECT IN THE PATHOLOGY AND TREATMENT OF LEPROSY.

ROBERT SINCLAIR BLACK, M.A., M.D. Edin., D.P.H. Aberd., Government Medical Officer, Cape Colony, contributed a thoughtful and suggestive article on the pathology and treatment of leprosy to the *Lancet* of October 20, 1906. It is doubtful if any communication in regard to leprosy since the discovery of the *Bacillus lepræ* has approached in importance the suggestions and clinical observations advanced by Dr. Black. Being clinical notes for the most part, and therefore unlikely to appeal to the advanced laboratory schools of the day, there is danger of his observations being overlooked. Dr. Black has for several years been attached to the Leper Asylum on Rodden Island, Cape Colony. In 1897 Dr. Kollé, of Berlin, commenced investigations on leprosy at Rodden Island, and directed Dr. Black's attention to the importance of the nasal passages in the clinical history and phenomena of leprosy. Working on the lines suggested, Dr. Black has arrived at important conclusions, which are at once of scientific and practical interest.

Regarding all varieties of leprosy as due to a common cause, and belonging to a single specific disease, Dr. Black found difficulty in accounting for the pronounced difference in the course and behaviour

of the two well-marked varieties, viz., maculo-anæsthetic and mixed or nodular leprosy. The former seemed the more mild form of the disease, causing less disfigurement and running a much longer course; the latter appears more virulent as regards disfigurement, rapidity of development, and fatality.

He observed that (1) rhinitis is a prominent feature of almost all (or probably all) cases of leprosy in the early stages; (2) the *B. lepræ* is met with in the nasal secretion of lepers in almost all (or possibly all) early cases; (3) in mixed and nodular leprosy the nasal secretion is excessive, and the bacilli present in numbers in the secretion; (4) in maculo-anæsthetic leprosy the nasal secretion is slight, and the bacilli fewer or absent; (5) in some mixed and nodular leprotic cases, when the nose had fallen in, copious nasal secretion lessened, and the disease became practically of the mild form attendant upon maculo-anæsthetic leprosy. He concludes from these observations: (1) That the maculo-anæsthetic is a mild form of leprosy attended by an early manifestation of a nasal ulcer, with some nasal secretion in which the *B. lepræ* is present, but from which the bacillus disappears in time, owing to the nasal ulcer healing, and the nasal secretion lessening or wholly drying up; (2) that mixed or nodular leprosy is attended by extensive ulceration, and a growth of granulation tissue in the nasal mucous membrane extending from thence into the naso-pharynx and to the cavities which communicate with the nose, thereby leading to distortion of the features. The nasal secretion in such cases is copious and charged with large numbers of the *B. lepræ*. As regards manifestations, Dr. Black is of opinion that mixed nodular leprosy is simply maculo-anæsthetic leprosy plus the infiltration and œdema of the subcutaneous tissues in various parts of the body, caused by the more active invasion of the *B. lepræ*.

"I think that there can be hardly any doubt that leprosy in its early stages begins as a small ulcer on some part of the extensive nasal mucous membrane. We know quite well from our clinical experience of the disease that leprosy ulcers in favourable circumstances tend to heal. There can therefore be little doubt that a person can suffer from a leprosy ulcer in the nose that may heal and pass entirely away. This is the explanation of the maculo-anæsthetic cases. They have had nasal ulceration which has passed away, in some cases leaving perhaps a cicatricial shrinking of the nasal septum, but during the time the ulcer existed leucocytes or white connective tissue corpuscles got detached from the ulcerating spot and along with the bacilli which they were attempting to devour were carried by the blood stream and lodged in various situations in the peripheral nerves, where they got entangled, and the bacilli then proceeded to grow, causing pressure on the fine nerve fibrils, and consequently setting up nutritive changes in the skin which these axis-cylinders supplied, thus causing the patches of discolouration and anæsthesia."

"In the nodular and mixed cases the progress of the disease is quite different. Instead of the nasal ulcer healing up it proceeds to grow apace, causing extensive destruction of the nasal mucous membrane, causing it to swell up and ultimately attacking the nasal bones themselves."

Dr. Black's observations help us to understand with something like precision the difference between mild and severe forms of leprosy, and to draw attention to the nose as being probably the primary focus of infection and the seat of the primary ulceration. The early rhinitis assumes an importance hitherto disregarded, for in the recognition of this seemingly trivial nasal catarrh may lie the key of the problem. It is seldom lepers apply for medical treatment whilst merely the symptoms of an excessive cold are in progress; did they do so, the examination of the secretion for *B. lepræ* would clear up the diagnosis and give opportunity, were the bacillus found, of treating leprosy by rational methods. There is no reason why the festering nasal sore, which is the real cause of the complaint, should not be attacked by curetting, by nasal douches and by other means, so that the source of infection may be done away with, or the potency of infection diminished. Even in more advanced cases the treatment of the nasal condition affords some hope of doing good and limiting or preventing further infection of the body generally by the destruction of the infecting organism at its source. Dr. Black has placed the treatment (and the prophylaxis) of leprosy on a rational plane; he has raised it from the mere "treating of symptoms as they arise," and of empiric treatment generally to a rational if not to a scientific platform; he has brought hope to the leper, and has taught us to divorce leprosy from the mystery which surrounds it, and to rank its manifestations alongside of other ailments arising by primary sores and other foci of infection.

SANITARY ORGANISATION IN INDIA.

THE Committee that met at Simla to consider the constitution of the new service of sanitary engineers has completed its work, and its recommendations will now be considered by the Government of India. The result of its deliberations will be awaited with keen interest by all concerned in the sanitary administration of our great dependency. We trust, however, that the new engineering experts will be made part and parcel of the department under the direction of the Sanitary Commissioners with the Government, and not form a sort of *imperium in imperio*, responsible only to the heads of the Département of Public Works. Up to comparatively late years, sanitation in India could hardly be said to be anything more than domestic sanitation on a large scale, and the technical questions involved fell easily within the powers of the ordinary medical graduate in sanitary science, but the growing necessity to deal with our great Indian cities on European lines has altered all this, and at the present day large sanitary engineering works are constantly in progress in every province.

The large waterworks which have been built during the last decade first brought the necessity of the entertainment of engineering specialists to the front, and most of these undertakings already possess a resident engineer, which for some years most provinces have possessed a consulting engineer in this branch, but these officials have been either municipal servants

or attached to the department of public works, and hence, though practically forming an integral part of our sanitary administration, have been of it, but not in it.

Benares is already provided with a system of sewerage on modern lines, and there can be no doubt that ere long the same must be done for our other great cities. The local peculiarities of Oriental towns differ, however, so markedly from those of Europe, that experience gained in the one field, however valuable, cannot qualify a man to take up, off hand, work in the other, and it is probably owing to this that the Government is now proposing to institute a special service of sanitary engineers. Any such accession of strength should, however, be made a part of one department, working along with the medical specialists under the direction of the Sanitary Commissioner. The training of a sanitary engineer, however able he may be, does not qualify him to decide what measures will be best suited to maintain the public health, any more than that of the medical graduate in sanitation makes him a judge of the best section and gradient for a sewer, or of the relative merits of different patterns of sluice valve.

The medical sanitarian, in fact, knows best what should be done, while his engineering colleague alone understands how to do it. The question of what to do remains, however, the consideration of primary importance, and unless this very obvious fact is kept well in mind by the Government there will be a grave risk of the Sanitary Commissioner being reduced to a cypher in the decision as to what measures should be adopted. To give a possible instance: The relative merits of septic tanks as compared with intermittent aerobic filtration, and their relative applicability to local needs, are questions for the medical expert; their construction, when decided upon, that of the engineer; but unless the medical element be given the key of the position, it may be taken as certain that the man best qualified to judge as to the health requirements of a locality will have but little voice in determining what plan should be selected.

The provincial sanitary committees were, and it is believed still are, composed of the head of the Provincial Department of Public Works, the Consulting Sanitary Engineer, the Inspector-general of Civil Hospitals, and the Provincial Sanitary Commissioner, a constitution which, it will be observed, in case of a difference of opinion between the engineering and medical elements, leaves the parties equally divided, and hence throws the ultimate decision on the executive authorities, who cannot be expected to understand much of the relative merits of either point of view.

Now, in practice those who have sat on such Committees know too well that it is extremely difficult for the medical members to carry into effect their views on the proposals brought before the Committee. A new meat market, for example, is projected for some town, and the engineers bring before the Committee plans, the preparation of which represents much trouble and expense, but which are obviously ill suited to the purpose, from the public health point of view, owing to ventilation being insufficiently provided for. The carrying out of the medical members' modification would involve the preparation of com-

pletely new plans, and probably spoil the architectural effect of the building. Assuming that the medical members stand to their guns, an attitude which involves much trouble and correspondence, the decision necessarily rests with the Lieutenant-Governor, who, as likely as not, argues that a sanitary engineer ought to know as well how to plan a meat market as any "doctor," and the result is at best the concession of a few utterly inadequate additional openings, and a building quite unsuited for the purpose for which it is designed, while the medical members are condemned as being impracticable and "wanting in tact." While, therefore, welcoming the proposed accession to the strength of our Indian sanitary forces, we trust that Government will take care that the engineering element shall be the helper, but not the master, of the Medical Sanitary Authorities.

LEPROSY IN COLOMBIA.

THE report that there were 30,000 lepers in a population of 4,000,000 in the Republic of Colombia, South America, is denied by the Colombian officials. The Consul General in London states there are but 5,000 lepers in a population of 5,000,000.

The leper settlements in Colombia are at Agua de Dios, Cano del Loro, and Contratacion; the last-named is to be removed to Capitia at an early date.

The Colombian Government are taking steps to place these three settlements in a thoroughly hygienic state.

Miscellaneous.

FIGHTING TROPICAL DISEASE.

A HANDSOME DONATION TO THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE FROM H.M. THE KING OF THE BELGIANS.

HOME SCOURGES PREVENTABLE.

A COMPLIMENTARY luncheon to Professor Ronald Ross, C.B., Professor R. Boyce, and Dr. J. L. Todd (in recognition of the decoration recently conferred on them by His Majesty the King of the Belgians for services in research into tropical diseases at the Liverpool School of Tropical Medicine), was given by the Lord Mayor of Liverpool (Alderman Joseph Ball) on October 1st, at the Town Hall, Liverpool. The following was the list of acceptances: Lord Mountmorres, Sir Alfred L. Jones, the Lord Provost of Edinburgh (Sir Robert Cranston), Sir James Barr, Mr. George Brocklehurst, Mr. W. Adamson, Alderman F. Smith, Mr. T. F. Harrison, Professor Moore, Mr. A. R. Marshall, Mr. W. Roberts, Dr. Evans, Colonel Frank Walker, Alderman E. Walker, Mr. Henry Jones, Dr. Nisbet, Alderman W. Hall Jowett, Mr. W. J. Bellis (Chairman of the Junior Reform Club), Mr. W. Muirhead (Chairman of the Junior Conservative Club), Mr. T. H. Barker, the Belgian Consul (Mons. E. Seve),

Mr. C. Livingston, Dr. Caton, Mr. F. C. Danson, Mr. R. W. Leyland, Alderman M. Hyslop Maxwell, Mr. A. H. Milne, Colonel Dobson, Mr. Ellis Edwards, Alderman C. H. Giles, Mr. A. Lawrence, and Mr. J. Gaffney. The Police Band played during the reception and repast.

After the loyal toasts had been duly honoured, the Lord Mayor, in proposing "Our Guests," said he had asked these three distinguished gentlemen to accept the hospitality of the Town Hall because he considered that honour should be paid to whom honour was due. Under the auspices of the Liverpool School of Tropical Medicine, Professor Ross, Professor Boyce, and Dr. Todd had undertaken the investigation of sleeping sickness, towards which work the King of the Belgians contributed a sum equal to £4,000 English. Having been satisfied with the work which was so effectively done and of such great value, His Majesty conferred upon these gentlemen a decoration of a personal character. He was sorry that Professor Boyce was not present. He had hoped to have attended this complimentary luncheon, but his doctor forbade him to travel from Harrogate. Proceeding, he remarked that Professor Ross had just received the honorary degree of Doctor of Law at Aberdeen University, while in 1902 he was awarded the Nobel prize for his discoveries in malaria. Dr. J. L. Todd was a medical graduate of M'Gill University, Canada. He had participated in several very important expeditions of the Liverpool School of Tropical Medicine, and had been identified with the late Dr. Dutton in carrying out the extensive study of sleeping sickness. Professor Boyce was the Dean of the Tropical School, which owed its inception to Sir Alfred Jones' and Professor Boyce's energy. As Chairman of the School of Tropical Medicine, Sir Alfred Jones had brought to bear great business capacity, much foresight, unbounded generosity, and an amount of enthusiasm, without which the work would have lacked much of its force. The Tropical School had only been in operation since 1899, and by 1905 £48,200 had been collected. Never was money more profitably spent than this £48,000. Sixteen expeditions had been sent out to tropical and sub-tropical countries. About 900 cases of various tropical diseases had been treated at a special ward in the Royal Southern Hospital, Liverpool, and he was glad that they had the Chairman of that hospital (Mr. Wm. Anderson) with them that day. Moreover, they were honoured with the presence of the Belgian Consul, and through him he begged to assure His Majesty the King of the Belgians of Liverpool's warm appreciation of his gracious act.

Sir Alfred Jones, in cordially seconding the toast, read a translation of a letter from the Secretary-General, Congo Free State, dated Brussels, September 28th. It stated: "You made reference to the fact that if his Majesty Leopold II. would consent to make an annual subscription of £1,000 for a period of five years, the Liverpool School of Tropical Medicine would be relieved of pecuniary difficulties. I have the honour to inform you that his Majesty the Sovereign King, responding to this appeal, has authorised me to place at your disposal a sum of £1,000. We hope that this subscription will not be the last which might be made to the institute."

A letter was read from Professor Boyce, who said the honour to himself and his colleagues was really paid to the Liverpool School of Tropical Medicine.

Professor Ross, in response, remarked that he had been previously honoured at the Town Hall during the Lord Mayoralty of Mr. W. Watson Rutherford, M.P. He should not only like to see all tropical diseases banished, but likewise all preventable diseases at home, such as measles, scarlet fever, and chicken pox. He believed that by the discovery of the causes such diseases could all be wiped out.

Dr. Todd, likewise acknowledging the toast, drew attention to the proposed memorial to Dr. Dutton, who had left a glorious example of self-sacrifice.

The Belgian Consul expressed, in the name of King Leopold and his fellow-countrymen, their congratulations on the success of the Liverpool School of Tropical Medicine, which was known all over the world.

The Lord Mayor, again rising, said: I should not like to part without asking you to drink the health of the Lord Provost of Edinburgh (Sir Robert Cranston, K.C.V.O.). His lordship has come to Liverpool to attend a church function in Everton, and I embraced the opportunity of inviting him to join us at luncheon to-day. If I mistake not, he will have been very much interested in all that has passed to-day. I venture to hope that the seed thus sown in his mind will ripen and bear fruit. We are not using Sir Robert as a medium for collecting money—the thought farthest in our minds—but we should like him, when he gets an opportunity in his own city, in which he is so respected and has so much power, to sing the praises of the Liverpool School, which is doing so much to reduce the diseases brought about by malaria. The more we can make known this fact the better it is for the world. We are not working on our own account, but for the good of humanity—helpless humanity. Gentlemen, the health of the Lord Provost of Edinburgh.

The Lord Provost, in reply, said Scotland was a poor country, but it would appreciate what the Lord Mayor had said. He agreed that municipalities should try to discover the causes and to eradicate preventable disease.

Sir James Barr gave "The Lord Mayor," and with his lordship's response the pleasant proceedings were concluded.

The Lord Mayor directed that the following telegram should be sent to King Leopold: "Grand Marichal de la Gour, Brussels.—Please convey to his Majesty the King of the Belgians the very hearty thanks of myself and the School of Tropical Medicine for the decorations conferred upon Professors Ross, Boyce, and Todd, and our warm appreciation of his Majesty's generous donation towards the noble work of stamping out disease. Am now giving luncheon party in honour of the three professors, and we present our respectful thanks to his Majesty.—From the Lord Mayor of Liverpool."—*Liverpool Post*, October 2nd, 1906.

Reviews.

THE PRINCIPLES OF TREATMENT AND THEIR APPLICATION TO PRACTICAL MEDICINE. By J. Mitchell Bruce, M.A., M.D., LL.D., F.R.C.P. Third Edition. Edinburgh and London: Young J. Pentland, 1905. (Demy 8vo, pp. 614.)

We have only had a few books in medical literature during the past century which can be said to approach the grade of classical literature. Symes' Principles of Surgery, Huxley's Physiology, and Watson's Medicine, are, perhaps, the most outstanding books of the kind, and were we to link the earlier editions of Druitt's Surgery, and Erichsen's Science and Art of Surgery with these, the list may be said to be completed. The Principles of Treatment, by Dr. Mitchell Bruce, revives the hope that the writers of to-day can approach these classical writers, and even surpass several. The Principles of Treatment, by Dr. Bruce, may legitimately be classed along with Symes' Principles, and higher praise cannot be bestowed upon any medical work. It is, moreover, encouraging that the book has reached a third edition, as it proves that medical men, in the multiplicity of books and periodicals, have not altogether lost taste for the classical in medicine. Every medical man who has a regard for the ideal in medicine and in the treatment of disease, has Bruce's Principles of Treatment on his shelf.

Correspondence.

THE IMMUNITY OF NEGROES TO VARIOUS FORMS OF CANCERS.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

GENTLEMEN,—Permit me to ask, through your pages, whether any of your readers have observed epithelioma of skin or rodent ulcer in negroes? During twelve years' practice I have only once seen this disease in one negro, and in this case the patient is an albino. Unfortunately, I have not yet persuaded him to allow its removal, though he promises to. My father, Dr. W. J. Branch, after forty years in the West Indies, has admitted to me that he cannot recall a single instance of this cancer in a black person. Cauliflower cancer of the cervix is the only epithelioma that in my experience affects West Indian negroes, and I have practised in six islands and have some acquaintance with several others. Among the poor whites, rodent ulcer and epithelioma of the lip are decidedly common.

If this exemption of the black skin from malignant disease is borne out by the experience of others, it is curious that more attention has not been directed to the phenomenon.

Yours, &c.,

C. W. BRANCH, M.B., C.M.

St. Vincent, British West Indies.

September 28th, 1906.

SCHAUDINN MEMORIAL.

THE FRITZ SCHAUDINN MEDAL.

In memory of Fritz Schaudinn, the famous Protozoologist, who enriched our knowledge by many discoveries, one of which was the cause of syphilis, there

will be presented, on the anniversary of his all too early death, a medal to the author of the most remarkable work on Microbiology. At present it is intended that the medal shall be given once every two years, and the presentation will take place through the medium of the Institut für Schiffs-und Tropenkrankheiten at Hamburg, on the staff of which Schaudinn worked before his death. It was ever his desire that protozoology should be considered to be, like bacteriology, a part of microbiology, in any department of which work worthy of the medal may be done. The necessary funds are already guaranteed, and care will be taken to secure the co-operation of scientists of all lands in the decision as to the worker best deserving the medal.

[We are glad to know that Schaudinn and his brilliant work is to be commemorated in a suitable fashion. We are obliged to the authorities of the Seemanns Krankenhaus und Institut für Schiffs-und Tropenkrankheiten, Hamburg, for the above notice.—*Ed. J.T.M.*]

DEAR SIR,—As you may perhaps be aware a movement has recently been set on foot in England to co-operate with Germany in forming a Memorial Fund for the wife and children of the late Fritz Schaudinn, of Hamburg. The list of the achievements of this eminent investigator is a long and distinguished one, and includes not only discoveries of the highest theoretical importance, but also many of practical application to disease as in the case of his well-known researches on anæmic dysentery and malaria. The last, and perhaps the chief, of his achievements, viz., the discovery of the micro-organism of syphilis, was made just before his death, and is still fresh in the public mind. The enclosed circulars indicate sufficiently, I think, the need for the formation of such a Memorial Fund.

Since the present state of international feeling renders it desirable that this British tribute of admiration to a great German should be as weighty as possible I have ventured to send you a copy of the appeal. I need scarcely add that the addition of your name to the Committee will be a valuable accession to its strength.

I am, &c.,
W. S. PERRIN.

(Hon. Sec. of the Committee.)

The Museums, Cambridge.
October 12th, 1906.

SCHAUDINN MEMORIAL

[Translation.]

DEAR SIR,—As I already informed you our Schaudinn was released from his sufferings on Friday morning last. His condition from the moment he came under medical treatment not only gave occasion for the gravest apprehensions, but was regarded as almost hopeless by the physician. . . . For weeks we lived between hope and fear without suspecting how serious matters were with him. Now he is taken away from us. What we have lost in him you know. The distress is so much greater in that we have no adequate substitute for him. Whether Protozoology, which had begun under his guidance to develop so brilliantly, will become without him what he promised to create for it, the future will show. But the blow has struck those he has left behind hardest of all his poor young wife, who expects within a few weeks the birth of a third child, and his two little children, a girl and a boy. They have all lost in their father their only support. The state of Hamburg of course pays a widow and orphan pension and will assess this as

highly as the legal definitions in any way permit. In spite of this it can only be a modest one, since Schaudinn died so young, little more than £100 for the widow and £25 for each of the children. It will thus be of value to render private assistance, i.e., to collect together some kind of memorial fund. An appeal, which it has been decided to publish, will address itself chiefly to the medical profession, and we are reckoning upon the dermatologists taking a prominent part. Among these Neisser, and others, have already promised their assistance. In addition a special grant on the part of the Prussian and Imperial authorities is hoped for. I should, however, think that the interest in Schaudinn abroad will not end with his life, but that people will gladly give proof of their high esteem for the dead to his family, which he has left behind in grief and necessity, by taking part in the work of love.

I therefore approach you with the request to open among your countrymen the matter, which now occupies all the friends of the dead, and which we can scarcely bring to the desired end through our power. I intend to apply to my friend Minot in America, and Blanchard in France, with the same request. In carrying out the plan I should much prefer to personally remain completely in the background; naturally, however, I place myself completely at your disposal with respect to any further information that may be desired.

Giessen,
June 28th, 1906.

J. W. SPENGLER.

DEAR SIR,—The enclosed letter has been received by Mr. Sedgwick from Professor Spengel, of Giessen.

It is proposed to co-operate in the movement which has been set on foot in Germany by forming a Committee of scientific men interested in Dr. Schaudinn's work. A list of the gentlemen who have already signified their approval of this scheme and have consented to join the Committee is now sent you. I have the honour to ask you if you will allow your name to be included in their number.

Subscriptions may be paid to Mr. Adam Sedgwick (at the above address), Treasurer of the Fund, or direct to the Schaudinn Memorial Fund at Messrs. Barclay and Co.'s Bank, Cambridge.

I am, &c.,
W. S. PERRIN,
Hon. Sec. of the Committee.

New Museums, Cambridge,
July 14th, 1906.

Committee.—Professor Clifford Allbutt, F.R.S., Sir Michael Foster, K.C.B., F.R.S., Mr. Jonathan Hutchinson, F.R.S., Professor E. Ray Lankester, F.R.S., Sir Patrick Manson, K.C.M.G., F.R.S., Professor William Osler, F.R.S., Mr. John Tweedy, President of the Royal College of Surgeons, Professor Sims Woodhead, F.R.S.E.

The following subscriptions have been received or promised :—

	£	s.	d.
The Right Hon. Lord Lister ...	20	0	0
Mr. A. Sedgwick ...	1	0	0
Mr. J. J. Lister... ..	5	0	0
Professor Sims Woodhead ...	5	0	0
Dr. J. Hutchinson ...	5	5	0
Mr. A. E. Shipley ...	1	1	0
Professor W. Osler ...	5	5	0
Professor T. Clifford Allbutt ...	2	2	0

[It is to be hoped that medical men in practice in the Tropics, in view of the great advance in our knowledge of tropical diseases due to Schaudinn, will subscribe to the Schaudinn fund.—*Ed. J.T.M.*]

Books and Papers Received.

"THE PRESCRIBER."

WE are favoured with the first number of a new monthly publication devoted to the pharmacy of the newer remedies, termed *The Prescriber*. The periodical is edited by Thomas Stephenson, F.C.S., Ph.C. A journal specially devoted to prescriptions and prescribing would be popular with medical men. We will await the development of the journal with interest, and hope that prescriptions and prescribing, as well as pharmacology, will find a place in future numbers. The journal is published in Edinburgh.

Notes and News.

MR. ANDREW CARNEGIE has given £10,000 to build a library for the University of St. Andrew's, of which University he is Lord Rector. Dundee University College also benefits by the sum of £12,500 given by the same generous donor for the purposes of a public laboratory.

BRUSSELS SCHOOL OF TROPICAL MEDICINE.—King Leopold opened the School of Tropical Medicine at Brussels, on October 13th. The School was founded by King Leopold, who has for many years appreciated the importance of the investigation of diseases in his tropical possessions and colonies. The Director of the School is Dr. van Campenhout, formerly the Superintendent of the Colonial Sanatorium at Watermael. Although the investigation of sleeping sickness will take a prominent place in the immediate investigations to be carried on at the School, instruction will be provided in all departments of tropical medicine. The links of sympathy and practical interest which already exist between the schools of tropical medicine in London, Liverpool, Paris, and Hamburg, will extend to the new school in Brussels, and it is to be hoped the several schools will still keep touch with each other in the future as they have done in the past.

SIR FREDERICK TREVES' interesting book, "The other Side of the Lantern," published by Cassell and Co., London, is re-issued in a "popular" edition. "The other Side of the Lantern" is a graphic and personal account of what the writer saw and noted in his journey round the world. It is written in the terse and enlivening style characteristic of all Sir Frederick Treves writes and does.

It is probable that Major Bird, C.I.E., Professor of Surgery in the Medical College, Calcutta, will be appointed Medical Officer in attendance on the Amir during His Highness's tour in India. Major Bird, it may be remembered, was highly successful at Kabul in treating injuries to the Amir's hand caused by an accident while shooting.—*Pioneer Mail*, September 14th, 1906.

IN spite of some inexplicable opposition from the Rangoon Chamber of Commerce, a branch of Lady Minto's scheme for an Indian Nursing Association is to be established in Burmah, and no country stands in more urgent need of an efficient organisation of the kind.

THE first report of the health officer of Rangoon is couched in a somewhat desponding vein, and it cannot be denied that the rat-killing operations have, as yet, not proved a particular success; but this is probably because the business has been taken up in a very half-hearted fashion. It stands to reason that, to be effectual, the campaign against rats should be conducted simultaneously throughout the entire town, and this does not appear to have been as yet attempted in Rangoon. Rats are notorious for their sagacity, and, it is well known, migrate at once should any considerable mortality occur among them, whether brought about by plague, poisoning, or any other cause. The result, therefore, of partial attempt is merely to spread the disease to quarters of a town that have been left untouched.

A FASHIONABLE wedding took place at Rangoon on September 6th, between Miss Linda Wilkins, daughter of the popular P.M.O., of the Secunderabad Division, and Lieut.-Colonel Menzies, Rangoon Port Defence Volunteers. The ceremony was conducted by the Right Rev. the Bishop of Rangoon.

A COURSE of not less than four lectures on the prevention of disease will be delivered annually at all stations where British troops are quartered. Whenever practicable, the dates selected for the lectures will be between April 1st and October 31st. The lectures will be delivered by Royal Army Medical Corps Officers, who will be selected by the General Officers Commanding Divisions and Brigades, with special reference to their fitness for dealing with the subject. Attendance at the lectures will be voluntary, but General and other Officers Commanding should impress on those under them the importance of acquiring some knowledge of this subject. The first series of lectures commence this month. This is a most excellent innovation, as there cannot be the least doubt that a large proportion of sickness in India, alike among Officers and men, is entirely due to ignorance of the precautions that should be adopted by all reasonable persons in such a climate.

X-RAY installations will shortly be introduced at ten central stations in India for army purposes. So far so good: as far as those quartered at these particular stations are concerned; but what about the large majority who are posted elsewhere? This means that at all other than these central stations, any case that may occur must needs await diagnosis until, in response to a proper official requisition, with an appropriate width of "margin," the apparatus is despatched to the outstation, a procedure that must often involve a delay of several days at the most critical period of a case. Although rather expensive, an X-ray apparatus is not costly enough to warrant so pitiable and misplaced an economy, and as many

private practitioners can provide themselves with one, Government can surely afford these appliances to each station, for at the present day an outfit of the sort has become one of the necessities of surgical life.

Two successful cases of treatment of snake-bite by the combined use of antivenene and the local application of permanganate, are noted in the annual report of the Sanitary Commissioner of the Central Provinces, India. In both cases a ligature had been applied immediately after the bite, and in one of them two hours elapsed before any other treatment could be adopted.

It is understood that the Government of India have appointed a Committee, consisting of Lieut.-Colonel Leslie, I.M.S., Sanitary Commissioner with the Government of India, Mr. Lionel Jacob, Secretary to Government in the Public Works Department, and Mr. D. Aikman, to draw up a scheme for the creation of a service of sanitary engineers as a separate branch of the Public Works Department. The Committee will draw up the regulations and conditions of service, &c.—*Pioneer Mail*, September 14th, 1906.

THE death is announced of Captain F. A. Pilkington, I.M.S., of heart failure. The deceased officer was well known and highly esteemed in Lahore.

ON November 9th, 1906, Professor Ronald Ross, F.R.S., C.B., will give an address on the subject of "Malaria in Greece," to the Medical Society of Oxford.

X-RAY BURNS.—In a discussion on the treatment of X-ray burns at a recent meeting of the New York Dermatological Society, as reported in the *Journal of Cutaneous Diseases*, Dr. Henry C. Piffard, Emeritus Professor of Dermatology in New York University, said that he had "obtained the most benefit in treating X-ray burns with antiphlogistine, chloride of zinc, high frequency current, and ultra violet rays."

OWING to the rapid spread of the cocaine habit in India, the Punjab Government has issued a notification under the Excise Act that cocaine, and every preparation and admixture of cocaine, are henceforth included in the definition of "intoxicating drinks." This will give the authorities the same powers of regulating the sale of the drug that they possess in the case of opium, Indian hemp or alcohol.

SOME time ago it was pointed out in "Notes and News," that the Hindu population in India would probably raise objections to the killing of rats, and already one can hardly take up an Indian paper without finding allusions to this difficulty, which constitutes the greatest obstacle to the efficient carrying out of this most practical of anti-plague measures. In Nagpur, the capital of the Central Provinces, a *Guru*, or Hindu religious leader, has been preaching against the sin of killing rats, and on being asked by Mr. Dewar, the Executive civil officer, what he thought of tiger shooting, the *Guru* replied that that was not a

sin, but a duty. Mr. Dewar pointed out that at present rats were destroying far more human lives than tigers had ever done; but common-sense and reason weigh so little with religious fanatics of any denomination that it may be feared that his most apposite parallel had little effect on the *Guru's* crusade. Accordingly, Mr. Ram Narayan, an influential native banker, proposes to provide a "rat-ruksha" or sort of pen in which the captured rats may be confined as pensioners for the natural term of their lives, the male and female animals being kept apart. To the home-staying European, all this appears too "Gilbertian" for grave consideration, but the proposal has been most gratefully received by Major Buchanan, I.M.S., who is in charge of the plague operations, and the thanks of all interested in Indian sanitation are due to Mr. Ram Narayan for a proposal which smooths the way over what bids fair to become an insuperable *impasse*. In the Punjab, on the other hand, the campaign against rats progresses steadily, and does not appear to be rousing opposition. Already nearly sixty towns have been included in the operations.

AN instance of the dangers attendant on the storing of grain in hot, damp climates, comes to us from Bangalore, where a serious outbreak of diarrhoea, which raised suspicions of the presence of cholera in the town, was traced to this cause. The stale corn was disposed of by mixing with sound grain in sufficient proportion to mask the musty odour of the decomposed article.

A PROFESSOR of Biology is to be added to the staff of the Lahore Government College.

WE learn that Lieutenant F. H. Stewart, I.M.S., who recently applied to Government for the post of Surgeon Naturalist, Marine Survey of India, has been posted to Gyantze, Thibet! The fact of the would-be deep sea fisher being sent to sit on the top of mountains 12,000 to 15,000 feet high needs no comment.—*Pioneer Mail*, October 5th.

THE contributions to Lady Minto's endowment fund for European-trained nurses now amounts to over £8,000.

THE *Pioneer Mail* of October 5th includes a useful review "by a specialist" of the measures that have hitherto been adopted for the suppression of plague, in light of our more recent knowledge as to the mechanism of its conveyance. He shows how the failure of protective cordons was inevitable, evacuation merely a palliative, and why disinfection, in the ordinary sense of the term, is worse than useless. Inoculation he regards as needless, in view of the fact that plague may now be regarded as though the most troublesome of all our epidemics, it is the most easily preventable. While in no way minimising the obstacles of native prejudices against rat-killing, he believes that the opposition will die down "as soon as the people understand that plague is primarily a rat disease." In one point we would, however, wish to set our contemporary correspondent right in a matter of history, when he says:—"Men were employed to disinfect houses, and a con-

siderable number of those who were employed on this work were attacked by plague. Boots and putties were provided for these workers, and with good results, but it probably never occurred to any one that the boots and putties produced their good effect by preventing the workers from being bitten by rat-fleas." Now, as a matter of fact, ammunition boots with pyjamas tucked into them at the ankle, were ordered to be worn by the men of the disinfecting gangs, by the Sanitary Commissioner of the North West Province and Oudh in 1899, because the holder of the appointment at that date held a firm belief that some insect such as the bed-bug or the flea would ultimately be proved to be the actual carriers of the disease, in spite of the discredit that then was thrown on the idea by bacteriologists, and he further directed that the boots as well as the legs and arms of the men engaged in the work should be kept greased with carbolic oil on account of the well-known aversion of fleas and other insects to greasy and strongly-smelling substances. The theory, it must be remembered, is a fairly old one, and although the triumph of the truth is but so recent a matter, the idea had even then already occurred to Lieutenant (now Captain) Glen Liston, although he did not publish any note on the subject till long afterwards. The certainty of our knowledge, and the conviction that, given intelligent co-operation on the part of the populace, plague is an easily controllable disease, is, however, a pleasant contrast to the groping in the dark of those days; for even those of us who most strongly held that plague must be conveyed by the agency of biting insects, had nothing but analogy to go on. The suggestion of using boots, &c., was, however, as a matter of fact, based on the idea that either fleas or bed bugs might very possibly be concerned in the matter, as it was felt that the circumstances of the case rather put our old friend the mosquito out of court, because were those insects capable of conveying the disease, few would be likely to escape.

A SPECIAL correspondent of the *Times of India* who has been visiting Poona to investigate the causes of the terrible exacerbation of plague in that city, draws a gruesome picture of the insanitary conditions subsisting in the poorer parts of the town. It is obvious that rat-killing operations can stand but little chance of success in such a honeycomb of dark, overcrowded cells as he pictures the homes of the people to be.

Personal Notes.

INDIAN MEDICAL SERVICES.

Arrivals Reported in London.—Lieutenant-Colonel E. W. Reilly, Captain T. G. N. Stokes, Major F. R. Ozzard, Major W. A. White, Major C. L. Williams, Captain F. H. G. Hutchinson.

Extensions of Leave.—Lieutenant-Colonel J. W. Poynder, 2 m. 21 d. leave, medical certificate; Major C. Duer, 3 m. furlough; Captain N. R. Rainer, study leave, May 1st to June 15th, 1906; Captain S. Anderson, study leave, April 11th to August 31st, 1906; Captain A. Miller, 6 m. furlough; Major S. A. Harris, 3 m. medical certificate; Captain S. Evans, M.B., 6 m. medical certificate; Captain H. R. Brown, 7 d.; Major T. W. Irvine, special leave commuted to furlough P.A. and extended

2 m. 8 d.; Major E. Wilkinson, study leave, May 1st to July 31st, 1906; Captain R. Brown, 14 d.; Captain R. M. Carter, 2 m. Captain J. H. Hugo, furlough to March 6th, 1907; Captain N. R. J. Ranier, study leave, June 16th to October 1st, 1906; Major W. H. W. Elliot, D.S.O., 27 days.

Permitted to Return to Duty.—Major J. Morwood, Major T. W. Irvine, Captain R. M. Dalziel, Major A. Street, Colonel H. Hamilton, C.B., M.D., Lieutenant-Colonel C. J. Starkies, Lieutenant-Colonel M. A. T. Collic, Captain L. J. M. Deas, Captain F. D. Browne, Lieutenant-Colonel R. H. Cama, Captain D. G. R. S. Baker, Captain A. E. J. Lister, Major P. J. Lumsden, Lieutenant-Colonel J. S. Daly, Major W. H. W. Elliot.

Trooping.—The following officers of the R.A.M.C., embarked on the *Rewa* for India on the 19th ult.: Colonel P. M. Ellis, Lieutenant-Colonel R. L. R. Macleod, Lieutenant-Colonel D. M. O'Callaghan, Captain A. W. Hooper.

Postings.

On transfer from Ferozepore, Major E. V. Hugo, I.M.S., is appointed to officiate as Civil Surgeon of Lahore, Professor of Midwifery and Forensic Medicine, Lahore Medical College, and Medical Officer in charge of the Medical College, Lahore, relieving Lieutenant-Colonel H. Hendley, I.M.S., proceeding on leave.

Captain Paton, services replaced under Sanitary Commissioner with Government of India.

Captain W. M. Pearson officiates as Deputy Sanitary Commissioner, 2nd Circle, United Provinces.

Captain W. H. Cazaly acts as Deputy Sanitary Commissioner, Southern Registration District, Bombay.

Captain H. Crosbie to additional charge of current duties as H.M. Consul, Kermanshah.

Major A. L. Duke, to additional charge of current duties as Political Agent, Bikanir.

Major R. J. Macnamara, services placed at disposal Sail Department, Government of Madras.

Colonel J. McCloghry is transferred as P.M.O. from Quetta, to Abbotabad.

Colonel H. K. McKao, C.I.E., from the Presidency and Assam Brigades to the Meerut Division.

Hon. Lieutenant L. J. O'Reilly, I.S.M.D., to be Civil Surgeon, Etah.

Major W. Vost is transferred from Gorakpur to Muttra, as Civil Surgeon.

Major D. M. Moir, Professor Medical College, Calcutta, is appointed to the Managing Committee of the Zoological Gardens, Calcutta.

Captain W. O'S. Murphy to the charge of the Observation Camp for Pilgrims, Perim, Dr. J. H. Walsh, Uncovenanted Medical Service, acting in his place as Special Health Officer, Kurachi.

On return from leave, Surgeon-General W. R. Brown, I.M.S., will become Surgeon-General with the Government of Madras, and Colonel P. Benson, I.M.S., who has been officiating, will go as Principal Medical Officer to the 6th (Poona) Division.

Captain D. Munro, to the Medical Charge, 11th Lancers.

Major F. R. Ozzard, to the Medical Charge, 7th Rajputs.

Captain A. Lister, to the Medical Charge, 19th Punjabis.

Captain N. W. Macworth, to the Medical Charge, 41st Dogras.

Captain R. M. Barron, to the 54th Sikhs.

Captain R. F. Bird is placed on Plague duty.

On return from leave Major S. K. Close becomes Civil Surgeon of Shahjahanpur, relieving Major J. G. Humbert, who goes to Farrukhabad.

Hon. Captain E. P. Clements, I.S.M.D., to be Civil Surgeon, Hardoi.

Captain E. L. Perry, officiates as Civil Surgeon, Dera Ghazi Khan.

Leave.

Colonel H. Barrow, R.A.M.C., for 6 m.

Lieutenant W. Brayne, 8 m. combined leave.

Captain D. N. Anderson, 6 m. combined leave.

Captain J. C. Kunhardt, 8 m. furlough.

Captain J. C. Robertson, 2 y. combined leave.

Captain F. H. Hutchinson, 1 y. 7 m. combined leave.

Captain F. Wall, 6 m., medical certificate.

Retirements.

The following Senior Assistant Surgeons, Bengal, are permitted to retire: Honorary Captains Brown, Bailey, and Hogan. Lieutenant R. Cobb is permitted to retire.

Captain L. Gundall is transferred to the temporary half-pay list.

Promotions.

Captains to be Majors, July 28th, 1906.—Thomas Arthur Granger, M.B., Harold John Kinnahan Bamfield, John Wemyss Grant, M.B., Arthur Henry Moorhead, M.B., William Davey Hayward, M.B., William Elmsley Scott-Moncrieff, M.D.

Lieutenants to be Captains, August 31st, 1906.—Robert Kelsall, M.B., John Hay Burgess, M.B., F.R.C.S., Charles Hildred Brodribb, M.B., John McCallum Anderson Macmillan, M.B., Clifford Allchin Gill, William Edward James Tuohy, Terence Francis Owens, Richard Francis Steel, M.B., George Francis Innes Harkness, Arthur Charles Ingram, M.D., Gordon William Maconachie, M.B., Ernest William Charles Bradfield, M.B., Alexander William Montgomery Harvey, M.B., Charles Isherwood Brierley, John Brown Dalziel Hunter, M.B., Edward Temple Harris.

Robert Joseph Macuamara, M.D., Herbert Wilson Pilgrim, M.B., F.R.C.S., Francis Wyville-Thomson, M.B., Edwin Harold Brown, M.D., F.R.C.S.E., Charles Norman Bensley, Selby Herriot Henderson, M.B., Blenman Buhos Grayfoot, M.D., David Wilson Scotland, M.B., Charles Robert Mortimer Green, F.R.C.S., Richard Henderson Castor, Thomas Edward Dyson, M.B., Edward Christian, Hare Frank Cecil Clarkson, John Gregory Jordan, M.B., Herbert Mackinlay Morris, Allan Rupert Postance Russell, James Morwood, M.D., Frederick George Maidment, Edmund Alexander William Hall, M.B.—September 30th, 1906.

R.A.M.C.

On arrival from England, Colonel P. M. Ellis becomes P.M.O. Quetta Division and Colonel J. G. Harwood, P.M.O., Presidency and Assam Brigades.

COLONIAL MEDICAL SERVICE.

Cyril E. Thwaites, L.R.C.P., M.R.C.S., has been appointed Civil Assistant Resident in Northern Nigeria.

Dr. F. G. Hopkins, Senior Medical Officer of Southern Nigeria, is acting as Principal Medical Officer during the absence on leave of Dr. H. Strachan, C.M.G.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Lancet," September 29, 1906.**(I.) TWO CASES OF HEPATIC ABSCESS TREATED BY THE TRANSPLEURAL OPERATION.**

Taylor, H., describes two cases of tropical abscess of the liver, treated by incision, removal of part of a rib, opening the pleural cavity, cutting the diaphragm, and on reaching the liver stitching the liver to the adjacent parts. In one patient, as usual, "very shallow, and interrupted respiration supervened on the admission of air to the pleural sac and patient became very cyanotic." In the same patient, "while the wound was being gently syringed out with 1 in 40 carbolic lotion, the patient suddenly complained of great pain in the epigastrium, became pallid, broke out into a profuse perspiration and vomited." Syringing liver abscesses has been frequently condemned, and Dr. Taylor's case adds another warning against the procedure. Dr. Taylor advocates the transpleural operation and condemns the use of the trocar and cannula, indulging, as usual, in wholesale abuse of the method, stating that: "I venture to think that such stabs in the dark, or at least into an

obscurity, are out of place," &c., &c. It will be seen that over-heroic operations for hepatic abscess by transthoracic and transperitoneal methods are still in vogue.

(II.) ENDEMIC HÆMATURIA.

Stock, Capt. Philip G. This is an account, from the epidemiological point of view, of an outbreak of bilharzosis among the men of the 8th Hussars, at Pretoria, in 1902, in which forty-three men were attacked. The author tried to repeat Sorsino's observations as to the existence of an intermediate host, in the shape of some species of mollusc, in which the parasite passes through a *redia* stage, but failed to obtain any confirmation of this view. He accordingly strongly favours the idea that the embryos pass directly to the human host, by the agency of water, either by drinking or by bathing, and argues that the former is the more probable mechanism of infection, as some cases had occurred who had not bathed, and that a certain amount of water always enters the mouth or nostrils when bathing.

He shows that the "period of incubation," i.e., the interval between infection and the appearance of symptoms, varies from one to two months, the movements of the troops giving an excellent opportunity of forming an opinion on this point. As to treatment, he makes the interesting suggestion of the administration of a toxin in the form of Wright's serum, basing his proposal on the disappearance of symptoms in two cases which contracted typhoid and in another of dysentery.

(III.) A CASE OF AINNUM.

Alexander, D. M., and Donaldson, R., describe a typical case of ainnum. Patient, 44, born in Port Antonio, Jamaica, went to sea at 14. Developed hypertrophy of little right toe and a subsequent narrowing behind. The part was amputated through the narrow neck, which proved to be of fibrous tissue and did not bleed when cut. The cause was not determined.

(IV.) THE STUDY OF A CASE OF PLAGUE.

Cleland, Burton J., states that the lengthy incubation noted in plague is due to the fact that living plague bacilli probably liberate few, or no, toxic bodies: it is only when owing to overcrowding of a gland bringing about loss of food supply, or as the result of anti-microbic bodies when the bacilli die, that their endocellular toxins are liberated and local and systemic reaction follow in proportion to the dose. In other words, the presence of living plague germ infection belongs to the period usually named the incubation period, and because the living bacilli are not toxic, and it takes some days before the bacilli are killed and their toxins are set free. Dr. Cleland sums up the argument when he states: "The onset of signs and symptoms in plague is the first indication of commencing recovery from the disease." This statement bears out that which was enunciated by Drs. Hunter and Simpson from observations made in Hong Kong. The development of the bubo is a late phenomenon of plague; gastro-intestinal symptoms (Hunter and Simpson) precede its appearance, and, in fact, all evidences of fever. In Dr. Cleland's case also, diarrhoea was one of the first signs of infection and preceded all others by three days. This theory, which is now being widely received, explains why there is so seldom any local reaction and as rarely a lymphangitis in plague, compared with other infections, say, by streptococci, and why one set of glands are, as a rule, infected, and supports also the skin inoculation theory of plague.

"Bulletin de l'Institut Pasteur," T. IV., Nos. 17 and 18.**ANTI-CHOLERA INOCULATIONS IN INDIA.**

Haffkine, Prof., gives an interesting *résumé* of his work on this subject extending over many years, and comes to the conclusion that although the case incidence among the vaccinated is only about a tenth of that obtaining among

the unvaccinated, the mortality among those actually attacked differs but little.

The protective effect of the vaccine commences at once and increases rapidly for the first four days after the operation, and lasts about fourteen months: after which its effects diminish rapidly and probably disappear completely.

These facts are of great interest in forecasting the chances of success of anti-typhoid inoculation, but can hardly be said to retain much interest in connection with the practical question of combating cholera, as Prof. Hankin's, of Agra, discovery of the use of permanganate of potassium for the disinfection of wells, has made cholera an easily controllable disease wherever the suspicious prejudices of the Indian native do not prevent the proper carrying out of the measure; and wherever this is the case it may be taken as certain that anti-choleraic injections will be even more stoutly resisted.

It must be remembered that these vaccinations are no light matter, and so much is this the case that in one instance in the abstracter's experience, the men of the Shropshire regiment who had had personal experience of the operation; through writhing in the agonies of cholera in a terrible outbreak at Sitapur, absolutely refused to submit to ordinary anodine hypodermic injections, because they suspected that the medical officers intended to repeat the anti-choleraic vaccinations that had been conducted in the regiment a few months previously.

"Bull. Chambre d'Agriculture de Cochín Chine," 1906, p. 39.

DISTRIBUTION AND SYMPTOMOLOGY OF SURRA IN COCHIN CHINA.

Brau, St. Sernin, and Mutin Boudet confirm the existence of surra in Saigon, already suspected by Blin and Chaptal, but regard the occurrence as merely sporadic in mules and horses from Annam and Cape St. Jacques. They distinguish two forms—the "dry" and the oedematous—of the disease, and found that the presence of the parasites in the blood was intermittent. Inoculated dogs died in about fourteen days, after a three days' incubation. They tried treatment with mercuric methylarsenate dissolved in K. I. with encouraging results.

"Centralbl. f. Bakter., I., Origin., T. xl., p. 683.

THE NEW ROUTE OF CUTANEOUS PENETRATION OF LARVAL ANKYLOSTOMES.

Schüffner, W.—Regarding infection by penetration of the skin as definitely established, the author attempts to define the importance of this route of infection as compared with that through the intestinal canal.

Schüffner is working in Sumatra, where ankylostomiasis is extremely common, but he nevertheless found considerable difficulties in obtaining cultures of the larvæ, and believes that this is due to the presence in the excrements of other rival organisms which may crowd out the young Ankylostomes. In his particular case the hostile and victorious organisms were *Strongylus stercoralis* and the larvæ of a fly, besides which he found it necessary to check the development of infusoria by the addition of 2 to 3 drops of a 10 per cent. solution of quinine. He specially studied the onset of cutaneous infection and finds that a few drops of a rich culture placed on the arm, produces, in half an hour, intense itching, and the subsequent formation of a pustule, but his sections of skin so infected, though they clearly demonstrated the fact of penetration, failed to confirm Loos' observations as to the hair follicles being selected by the larvæ as a point of entry. The neighbouring tissues were markedly infiltrated with eosinophil leucocytes.

He notes that the larvæ disperse very rapidly in water, and hence concludes that infection must usually be by isolated individuals, under which circumstances the local irritation is far less than that of a mosquito bite, and no pustule forms, so that the occurrence would usually pass unnoticed. He further discusses the various cutaneous lesions that have been described, and in particular "ground itch."

and comes to the conclusion that none of them bear any relation to the penetration of the ankylostomes.

In making these observations, Schüffner overlooks the undoubted fact that infection by the agency of water is probably a very rare occurrence, as the larvæ require faecal matter for their nutrition, and die out very quickly in water unless it be grossly foul with excrement to such an extent that the most callous of indigenous races would neither drink of nor bathe in it. Note also Loos' observation of their habit of crawling out of water. The much fouled soil, however, in the neighbourhood of native villages usually teems with the larvæ, which must thus be constantly brought in contact with the naked feet and ankles of the inhabitants, while his negative results in the search for larvæ in these skin lesions can count for nothing as opposed to the positive results of previous investigators. No one pretends that larvæ can constantly be found in all stages of what is known as "ground itch," as the irritation and pustulation are maintained by the agency of scratching and of ordinary pyogenic organisms long after the larvæ have passed through the skin; which indeed must, in all probability, be rendered unfit to serve as a site for further penetration by the inflammatory changes set up. His explanation, however, of the capriciousness of the results of breeding experiments through the action of rival organisms is, however, of great importance, and to those who have worked practically at this question, accounts for much that has hitherto been puzzling.

"Scient. Memoirs of the Med. and San. Departs. of Govt. of India."

PARASITE OF THE WHITE BLOOD CORPUSCLES OF PALM SQUIRRELS.

Patton, Capt. W. S., I.M.S.—In Kathiawar, some 98 per cent. of this squirrel (*Funambulus pennantii*) were found to be infested by a parasite of the mononuclear leucocytes, as many as half the corpuscles being infected. The parasite is of vermicular form, 13 to 15 microns long, by 3 to 4 microns wide, with pointed ends, and has been named by the author *Leucocytozoon funambuli*.

They are typical hæmogregarines, stain well with Romanovsky, and possess a voluminous nucleus (sometimes double), which is central in position, besides which there are a number of cytoplasmic granules.

Comparing infected animals with healthy squirrels from Madras, the former were found to present a marked excess of mononuclears, a point which the author believes may have a bearing on the etiology of leucocythæmia. The parasites are very numerous in the spleen and may be readily found in the liver and kidneys, but none of the organs showed any developmental forms. The only external parasite harboured by the squirrels was a louse, which proved to be a new species of the genus *Hæmatopinus*, but no evidence could be found of the louse acting as an intermediate host.

"Schrift, der Physch.-ökonom. Gesells., z. Königsberg, T. lvii., p. 97.

THE PENETRATION OF THE SKIN BY NEMATODE LARVÆ.

Lühe, M.—The researches of Loos on this subject appears to the author to afford an explanation of a point noted by him in 1896, in the examination of the body of a panther. The pulmonary alveola contained enormous numbers of nematode larvæ, very uniformly distributed through the organ, but without producing any obvious lesions. The other organs were free from any similar parasites except the intestine, and between the villi of the latter were young examples of *Uncinaria perniciosa* which had

caused small extravasations of blood. He now regards these facts as but another example of the migration of nematodes in the manner discovered by Loos.

"Zeitschr. für klin. Med.," T. lxxiii., p. 43.

ANKYLOSTOME INFECTION *viâ* THE SKIN.

Loos, Dr. A. Returning to the consideration of this subject, the author discusses replies to the objections that have been raised against his theory of infection and the practical considerations that result therefrom.

He first recapitulates the steps that led to his discovery--his accidental infection of himself under circumstances which rendered invasion *per os* highly improbable; the experiment on the leg of a patient an hour before amputation, and those he afterwards made on young dogs with *Ankylostomum caninum* and *duodenale*, and recalls his conclusion that the route followed by the larvæ is the venous or lymphatic system, the right heart, the lungs, trachea, œsophagus, &c. While passing through the lymphatic glands, particularly those of the axilla, large numbers of the larvæ are destroyed by phagocytes, and the stages of the process are followed out.

The symptoms produced depend largely on the number of larvæ that gain admission simultaneously. When this is serious they consist of diarrhœa, more or less general œdema, and multiple hemorrhages which he attributes, not to mechanical but to toxic action. The age of the subject greatly influences the results as the skin in the young is much more easily penetrated, and the resulting infection proportionally more serious.

Arrived in the intestine, Loos believes that the worms feed not on blood, but on the mucosa, and considers the hemorrhage that results as accidental.

It may, however, be pointed out that in expressing this opinion Loos runs counter to the undoubted fact that the greater proportion of parasites found *post-mortem* in the intestines are swelled out like leeches, and that the contents of their intestines undoubtedly consist of blood. Moreover, when examined still living *in situ*, in a *post-mortem* conducted sufficiently early after death, the ankylostome will be found so firmly fixed to the mucous membrane that it is difficult to understand how any food other than the blood from the bite can gain access to the buccal cavity of the worm; and it may be further noted that Loeb and Smith described certain organs producing a powerfully anti-coagulant substance which would be quite useless, assuming Loos' very surprising theory on this point to be correct.

Loos does not deny infection *per os* as an occasional mode of access for the parasite, but believes that it is of very minor importance as compared with penetration of the skin, and, further, is of opinion that when the former takes place, drinking water is seldom if ever the vehicle, but that raw vegetables are more frequently concerned, though the commonest method of infection by this route is through eating with hands soiled with earth, especially in the case of miners.

He states that the larvæ die very rapidly if dried, so that unless they penetrate the skin very shortly after deposition on it, they necessarily perish; but this sensitiveness to desiccation is quite contrary to the abstractor's personal experience, and though the latter is aware that Loos explains this by the presence of other species of nematode larvæ in the cultivations used, he does not find the explanation adequate, and believes that under certain circumstances the larvæ show remarkable powers of resisting dryness, short of absolute desiccation.

A very important observation made by Loos is that larvæ that find themselves in water, crawl out of it by climbing the moist banks of the pool, and that they are thus found at all heights--on the sides of mine shafts and drivings, so that they are continually coming in contact with the hands of the miners as they feel their way along the ill-lighted passages. This migration can not, however, as Tenholt supposes, be made in search of food, as at this

period of its existence the larvæ is enclosed in a capsule formed by the integuments of its last ecdysis.

The larvæ develop best at a temperature of 28° to 30° C. and still develop slowly at 15°, but the danger to miners from the disease is nevertheless always proportional to the warmth of the mine. With regard to prophylaxis, Loos, like every other practical observer who has studied the subject, comes to the conclusion that no measures other than those of an efficient conservancy can be expected to be of any real use.

"Ann. de l'Inst. Pasteur," May, 1906.

Nicollé finds that some monkeys, particularly *Macacus sinicus*, show a certain amount of susceptibility to leprous inoculation, the subcutaneous method of inoculation is the only one productive of results, and the best results are obtained after successive inoculations. Inoculation according to experimental research varies from twenty-two to ninety-four days; the lesions produced are transitory, although many leprous bacilli have been shown by Nicollé within the large mononuclear leucocytes.

"British Medical Journal," October 20, 1906.

I.—NOTE ON A FILARIAL LARVÆ IN THE BLOOD OF A BLACKBIRD.

Symmers, Wm. St. Clair, found in a dead blackbird (*Turdus merula*), in his garden at Belfast, Ireland, filaria embryos in active movement in the heart blood. The larvæ resembled closely *Filaria perstans*, being without a sheath and having both extremities blunt. In size it is smaller than *perstans* and is apparently identical with the larva described by Manson in "Natives of British Guiana." The parent worm was not found in the blackbird. Avian filariasis is well known in several parts of the Tropics, but the discovery of the embryo in the British Isles, by Symmers, is of great interest, especially in regard to the geographical distribution of this parasite.

II.—MEMORANDUM ON THE OBSERVATION OF SPIROCHÆTES IN YAWS AND GRANULOMA PUDENDI.

MacLennan, Alex., in smear preparations from yaws sent from St. Vincent, West Indies, by Dr. Branch, found spirochætes similar to those of *Spirochate pallida*. In one preparation taken from a papilloma in recurrent yaws, numerous spirochætes were observed.

In two smear preparations from *Granuloma pudendi* sent by Dr. Branch, Dr. Mackennan found spirochætes, probably *refringens*. In one smear the parasites were found much longer than the *Spirochate pallida*, and the waving finer and closer; as many as forty waves being counted in one specimen.

III.—LARVÆ IN THE INTESTINE.

Drew, H. V., F.R.C.S., writing from Timaru, New Zealand, states that some two years ago he had as patients a mother and child suffering from a "nest of insects" similar to the condition described in the *British Medical Journal* of July 14, 1906. Mr. Drew states that the mother showed him "insects with rounded, hard, hairy backs, dark brown in colour, with black eyes, extremely repulsive looking, which ran about quickly." Santonin and purgatives brought away large numbers of these insects. Mr. Drew suggests they may be those of bot-flies, and enquires what is known concerning them.

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communications.

MALARIA IN GREECE.

An address delivered to the Oxford Medical Society on
November 29, 1906.

By RONALD ROSS, F.R.S., C.B.

Professor of Tropical Medicine, University of Liverpool.

(Professor Osler, M.D., F.R.S., in the Chair.)

PROFESSOR OSLER AND GENTLEMEN, — I consider myself extremely fortunate in being able to introduce the subject of malaria in Greece to my countrymen, through such a very appropriate avenue as the Oxford Medical Society. I was actually considering how the introduction might best be effected when I received the invitation from your Secretary to address you to-night. For where could any one who wishes to discourse of Greece do so much better than in Oxford—herself the daughter of Greece, who has borne through the ages the torch first fired in that divine country? And, since my subject is Æsculapian, what audience could I find fitter than yourselves? But my luck does not end here; for in you, Mr. President, I have chanced upon the fittest of all presidents, eminent alike in science and in the humanities, to both of which my theme appeals. Further, when I first opened my beggar's wallet for subscriptions in aid of the cause which I have to advocate to-night, it was yourself who contributed the first dole—a goodly number of solid drachmæ, in aid of Greece. The omens are therefore propitious, and if I fail it will be the fault of myself rather than of fortune.

First let the Muse explain (she is sorry that she cannot do it in hexameters) how it came that so humble an advocate as myself was selected for so great a client. Early in the year I was asked by a British Company, which owns certain large tracts of land in Greece, to go there in order to advise as to the best means of reducing the malaria which for a long time had been persecuting the Company's employees. I arrived in Greece towards the end of last May, and there, sure enough, found Andromeda in tears, awaiting the onslaught of the fell monster which was just then preparing to arise (metaphorically speaking) from his long winter sleep in order to devour her. After inspecting the latter, instead of slaying him outright, I determined, more wisely than heroically, to retire for assistance, and I am here to-night in furtherance of that intention.

Now let me begin by describing exactly my own experiences in Greece. As everyone knows, the country consists principally of a mass of mountains with small valleys between them, here and there, and many straits and inlets of the sea. In fact, the configuration is very like that of the Highlands of Scotland. The scenery does not possess the great variety of colour caused by the light and shade of the humid atmosphere of the Highlands; it is brightly but uniformly coloured. On the other hand, its compara-

tive aridity is compensated for by a singular beauty and variety of contour, which are not excelled in the Alps or even in the Himalayas. High enough to retain for most of the months of the year an exquisite lacing of snow, the mountains, though barren and stony, make a long vista of outlines against the very lovely sky. I have never seen a sky equal to that of Greece. In the Tropics a yellow light is reflected from the burning ground upon the lower strata of the air, and only the zenith is blue; but in Greece the azure extends almost down to the horizon, except for a narrow margin of brilliant silvery or pearly light. After sunset the sky seemed to me to possess, not the deepnight blue of the Tropics, but a wonderful purple tint of its own, in which the "new-bathed stars" shine with a brilliance not exceeded even in the desert. At mid-day, the almost tropical glare of the sun on the chalky soil is relieved by the dark shades of the plane trees and the classical cypresses, and the bright green of the vines. It has been my fortune to see many beautiful countries, but I think that Greece and Britain hold the palm.

The particular valley which I was called upon to visit was that of Lake Kopais, in Bœotia. After leaving Athens, the comfortable train winds along between Mount Pentelikon on the south and Mount Parnes on the north. Then, passing across the eastern spurs of Parnes, in full sight of the Island of Euboia and its strait on the right, it enters the valley of Thebes. Traversing this it goes through the defile of the Sphingion (where the Sphinx used to waylay travellers with her riddles) and emerges on the Kopaik Plain. This is a large area about six miles broad and twelve miles long, the long axis pointing west and east. On the east the plain is bounded by the Mountain of the Sphinx, which seems, from certain points of view, to have the shape of a woman's figure reclined along its crest. Along the whole of the south side runs the beautiful range of Helikon, the Mountain of the Muses. The birthplace of Hesiod is in one of its valleys; and near one of the summits there is the famous fountain of Hippokrene, where the winged horse, Pegasus, took flight for heaven, owing, it is said, to some annoyance from the literary critics of the day. At the western extremity of the plain rises the magnificent mass of Mount Parnassus, the Mountain of Apollo, with its summits clad in dazzling snow. But to resume. The Kopaik Plain itself is almost absolutely flat right up to the feet of the hills which bound it, being, indeed, the dried bed of a lake. In ancient days, according to the interesting writings of Dr. J. G. Frazer, of Cambridge, this lake was a large sheet of water in the winter, and, in the summer, a series of marshes overgrown with sedge, with rivers winding through them and patches of dry land between. The lake was drained in very remote times by the people of Orchomenos, a town upon its banks, and the remains of the drainage works are still visible. The water enters from numbers of small rivers and streams gushing out of the surrounding mountains, and naturally escapes, singularly enough, into great caverns, of which there are many, called *katavothræ*. In the Middle Ages the drainage works appeared to have been allowed to fall out of repair; but recently a French company resumed the task; and, still more

recently, the work was taken up by the British Company, the Lake Kopais Company, which asked me to study the malaria for them. The whole bed of the ancient lake is now a great plain covered with crops of all kinds, which repay the cost of the engineering works. The water is at present discharged through adjacent valleys into the sea.

It was here that the malaria was so troublesome. The Lake Kopais Company has many hundreds of employees and tenants, who were constantly being attacked, although most of them were natives of Greece. It had not been found possible to keep accurate statistics of the annual number of cases; so that my first care was to make an estimate for myself of the amount of malaria present. This can be done with a fair degree of accuracy, without the help of statistics, in two ways—by ascertaining the proportion of people which, first, have the parasites of malaria in their blood, and, secondly, possess enlarged spleens. The first method was much used in India by Stephens and Christophers, who called the ratio of infected persons to the total population the *endemic index*. To obtain an absolutely correct figure by this means we must make an exhaustive microscopical examination of the blood of every person in the area under consideration; but this would be too laborious for practical purposes; and we must consequently content ourselves with an approximate valuation obtained by examining only a part of the local population. As shown by these observers, and by Professor Koch, it is especially the native children in a malarious locality who have the parasites in detectable numbers—the older people becoming comparatively immune. The blood of a number of unselected children is therefore carefully searched for the parasites, and the ratio so obtained is recorded as the approximate endemic index. For exact work a large number of children must be examined, as otherwise the margin of error, as shown by Poisson's formula, will be very considerable. For example, if 50 children be examined, and 25 of them be found to contain parasites, the error will be no less than 20 per cent.; so that the approximate endemic index will not be 50 per cent., as a hasty observer may think, but anything between 30 per cent. and 70 per cent. This fact is worth recalling, because it has been much overlooked in recent work on the subject, and because it shows how laborious the method really is. The second method, that of examining children for enlargement of the spleen, a thing which can be done in a minute, is much easier, and fairly trustworthy, provided that no other cause for splenomegaly is present.

With the valuable assistance of Dr. Kardamatis, General Secretary of the Grecian Anti-malaria Society, and of Mr. D. Steele, Manager of the Lake Kopais Company, in Greece, I was able to use both methods. The Company's houses are on the southern border of the plain, close to the site of the ancient Haliartos, where the Spartan Lysander was defeated by the Thebans, 395 B.C., and to the reputed grave of Alkmene, the mother of Hercules. The houses are built just where the slopes of Helikon begin to rise from the plain; so that they were obviously not too highly situated to be affected by the malaria. On examining 57 of the employees, most of whom were

Greeks, we found enlargement of the spleen in 14 and the parasites in 9. But 5 of those that had parasites had no enlargement of the spleen, and must be added to the infected list, which therefore amounts to 19 out of the 57, or one-third. The majority of these people were adults; and many had come from other localities, so that the figures are not useful for statistics.

Our next care was to examine the people in some of the neighbouring villages. Out on the plain, about a mile or more from the Company's houses, there is the village of Moulki, containing some 350 inhabitants. The houses are closely clustered together, with very irregular and elementary lanes between them. Going to the village inn close to the school, we set to work and examined 80 persons, mostly children; first, by palpating them for enlargement of the spleen, and secondly, by making dried films of their blood for future microscopical enquiry. The scene was most interesting. Seated under a large tree, with the village priest as our patron and protector, we pricked and palpated the little ones, one by one. I never saw pluckier children. Scarcely one of them even winced at the vivisection. Nearly all of them were very intelligent, and many good looking; but, alas! most of them were far from well, and some looked miserably ill, emaciated and anemic. The cause was speedily revealed. Out of 62 of the children, between the ages of 5 months and 14 years, no less than 35 were found to have enlarged spleens; and as no other cause of endemic splenomegaly, such as kala-azar, could be ascertained to be present in the locality, we could attribute the enlargement in these children only to malaria. This diagnosis has been fully confirmed by subsequent examinations of the blood films, which showed that the parasites existed in at least 17 of the 62 children at the time when the films were made. Of these 5 had an appreciable enlargement of the spleen, so that this number must be added to the number of spleen cases in order to arrive at the total yielding evidences of infection. Hence, out of the total 62 children, no less than 40 were certainly infected—a ratio of them of 64·5 per cent. This is, of course, the lower limit of the ratio, because it is quite possible, and indeed very likely, that the parasites were overlooked in some of the films. Such a ratio was unexpectedly high for any European country, and is almost equal to any that has been found in Indian or African children.

I may add that in many of the children the splenic tumour was very great, reaching almost to the crest of the ilium. This is important, in view of statements recently made in India to the effect that great splenic tumour is probably due to kala-azar, rather than to malaria. The former disease is apparently not present in Greece, the *Leishmania donovani* parasite never having been discovered there. Moreover, the Grecian cases were markedly different from the cases of kala-azar studied by me in Assam, in 1898, for the purposes of an official report. In not a single one of the former did we note any enlargement of the liver, so commonly seen in kala-azar; there was not the constant fever of kala-azar, the expression of the face was the unconcerned expression of malaria rather than the hopeless look of the deadly eastern disease; and lastly, the death-rate was far too small for the latter. Nevertheless, the splenic enlargement in a few of these cases of

pure malaria was, I think, as great as anything I saw in kala-azar. Of course, many of the children were shockingly anæmic and emaciated—not in any way, I was informed, from lack of food, nor, apparently, from the great prevalence of other diseases. The work was clearly that of the spirit of the marsh.

The next thing to do was to find the source of the malaria, or rather its carrying agents, the local Anophelines. As I have said, the Kopaik Plain is now drained and cultivated over its whole extent; but numerous small streams enter it from the surrounding hills, traverse it, and discharge into the main channels of drainage. These streams are swollen torrents in the winter, but in the summer often become trickles of water with occasional marshy borders here and there. Several such streams enter the basin near Moulki; but at that season (May to June) we could find no Anopheline larvæ in them, though some have been found subsequently, as we conjectured would happen with the advance of the dry season. But in addition to these streamlets there exists a long series of shallow pools suitable for the larvæ in the "borrow-pits" made by the engineers who constructed the railway embankment across the plain. Sure enough, in some of these pits close to Moulki we found the peccant insects, the larvæ of *Myzomyia maculipennis*, a known carrier of malaria. These gnats, rising from the pools, pour into the village and into neighbouring houses, such as those of the Company; become infected by biting the numerous infected children; and then infect any healthy persons whom they may subsequently bite. The old drama, now so well known, was obviously being played out before our eyes.

After having dealt with Moulki we examined the conditions at another village of about 575 inhabitants, situated several hundred feet high on the hills south of the Company's houses, and called Mazi. Out of 40 school children, we found enlargement of the spleen in 13, and the parasites of malaria in 16. Of those that showed the parasite, 7 had no enlarged spleen; so that we must add them to our total of infected children, giving 20 infected out of a total of 40 examined, that is, one-half. This is a large proportion, and we expected to find some breeding pools of Anophelines close at hand. In this, however, we failed; though we saw some lime pits which we thought might become suitable for the larvæ at a later season. But, nevertheless, there was no difficulty in explaining the malaria at Mazi, since we learnt that every year nearly the whole population descends to the plain for the harvesting in the month of August (the most malarious month) and bivouacs there for days or weeks. Doubtless the people of Mazi become infected on these occasions; though I suspect that breeding pools will be found close to the village by more extensive search.

My time being very limited, we could make only hasty studies at other spots. Across the Plain lies the village of Skripou, on the site of the ancient Orchomenos. Here we found splenic enlargement in exactly half of 40 school children examined; but had no time to take blood films. The village is evidently intensely malarious. We had time to look for mosquito larvæ only in one spot, the beautiful

Fountain of the Graces, which gushes out of the mountain and spreads in a small marsh near at hand. Here, again, we found the shameless insects desecrating the divine spot. What must have happened when the Graces bathed there I cannot say. We saw only washerwomen and geese.

Thus on the borders of the Kopaik Plain we had examined 142 children and had found certain evidence of malaria in no less than 80, or 57 per cent., a very high malaria rate. But we soon obtained evidence that the disease is not confined to this low-lying area. Livadhia is a beautiful little town of 6,250 inhabitants, situated 540 feet up the spurs of Helikon, some miles beyond the western end of the Plain and facing Mount Parnassus. It begins at the romantic gorge where was the Oracle of Trophonios in former days, and where the two springs of Lethe and Mnemosyne—Forgetfulness and Memory—now flow out of the rock. Notwithstanding the height of the situation and the absence of any apparent marshes close at hand, we found enlargement of spleen in 16 out of 100 school children here. The infection is probably obtained in lower areas outside the town; but we had no time to make any search for the Anophelines. We spent some hours also at Thebes itself. This famous place, which used to contain 40,000 inhabitants now contains only 4,780. Situated on a rocky eminence in the midst of a large plain, the historic Kadmeia, it is considered to be very fairly healthy; and indeed we found enlargement of the spleen in only one child out of 50 examined; and failed in obtaining any larvæ of Anophelines in several small pools round the base of the renowned citadel. Such researches carried out on the spot where lived Pindar and Epaminondas, where Theban, Athenian, and Spartan had frequently mingled in battle, and where angry Alexander wreaked his vengeance, were "of the age." I am not certain whether the little wriggler of the puddles had not been a worse enemy to Thebes than was the great conqueror. One remains, the other has passed away for ages. If Diogenes had possessed our present knowledge he might have made a still more caustic reply to his powerful visitor.

Thus, altogether, out of 292 unselected children examined by us in five different places, we found unmistakable evidence of malaria in 97, or one-third. In addition to the children we examined 18 adults at Moulki. As is now well known, the adult natives of a malarious locality become comparatively immune, their spleens returning to the normal size, and the parasites becoming extremely scarce in their blood. Nevertheless, we found signs of malaria in 4 of these adults, but, of course, such figures are not useful for estimating the endemic index. Including all, we found certain evidence of malaria in 120 out of 367 persons, or 32 per cent. The figures for the children, however, give a reliable and high malaria rate, especially when it is remembered that they were collected at the beginning of the summer, before the annual malaria season had commenced. Later in the year the endemic index would certainly have been still higher. If, moreover, we had examined the blood of the 200 children dealt with at Orchomenos, Livadhia, and Thebes, we should certainly have been able to add many other cases of infection to our list; while lastly,

we should remember that in all cases of malaria the parasites frequently become temporarily too few for detection by the microscope. Our total estimate of 33·2 per cent. infected children must therefore be much below the maximum ratio, and may be looked upon as a minimum ratio. The statistical corrections by Poisson's formula works out at 7·7 per cent.; so that we have finally for the five localities, Moulki, Mazi, Orchomenos, Livadhia, and Thebes, a minimum child-malaria rate of between 25·5 per cent. and 40·9 per cent. The truth is, probably that at Moulki and Orchomenos *all* the children are really infected in the autumn.

With regard to the number of breeding places of Anophelines we found them only in two small pools, one at Moulki and one at Orchomenos; and the former of these was immediately drained away by Mr. Steele, of the Lake Kopais Company. The season, however, was early, and our search far from exhaustive. Many more pools will, of course, be found; but, nevertheless, I infer that the amount of breeding surface per square mile of country is extremely small, so that anti-propagation measures ought to be correspondingly cheap.

Such were the results of my own observations; and I will now give briefly some figures which I obtained for the whole of Greece. Within the last year or two there has been founded at Athens an admirable Malaria Society for the study of such questions. It is under the patronage of H.M. the King of Greece, and consists of many enthusiastic members. One of these is my friend, Dr. Savas, Professor of Hygiene at the University of Athens, and Physician to the King of Greece; and the General Secretary is my friend Dr. Kardamatis, who gave me so much assistance at Lake Kopais. I can testify to the complete knowledge of the subject possessed by both of these gentlemen—whom I mention more particularly than their colleagues, because I was brought more especially into contact with them; to their zeal in the cause, and to their philosophic grasp of the importance of the malaria question for their country. From them I obtained the following approximate figures for the whole of Greece:—

Population of Greece	...	...	2,433,806
Average annual number of cases of malaria	...	...	250,000
Average annual number of deaths from malaria	...	...	1,760
Number of cases of malaria during 1905	...	...	960,048
Number of deaths from malaria during 1905	...	...	5,916

These figures are, I think, as sound as any that can be collected from statistics. Malaria is a very difficult disease to deal with in this way; because it does not consist of a single severe attack demanding immediate medical assistance, but rather of a series of comparatively slight attacks extending over a period of years, and, moreover, occurring principally in young children. Many cases do not find their way into the returns at all; while, on the other hand, relapses must be frequently entered as fresh infections. As for the death-rate, comparatively few cases die simply of malaria, but many are carried off by intercurrent pneumonia or diarrhoea, or perish gradually from

anaemia, under which headings the mortality is often recorded. The figures given above, however, agree entirely with my own estimate of the endemic index round Lake Kopais; and I believe that if similar methods could be used all over Greece—if all the children in the country could be examined—it would be found that an extremely large proportion of them are constantly infected. Last year was a very bad year, with a recorded death-rate of 2·4 per thousand of the population. Nor is the malaria of a benign type in Greece. On the contrary, I was informed by all the gentlemen mentioned above and also by a number of medical men whom I met at Thebes and Livadhia, that pernicious attacks are very common, and that the most serious form, that of blackwater fever, is extremely common. Such facts are recorded also in the writings of Kardamatis, Savas, and other able Greek observers. The disease is therefore extremely, if not shockingly, rife in the country—much more so even than in Italy. Dr. Savas told me that from some statistics which he had studied the number of cases and deaths in Greece are half again as numerous as in Italy for equal numbers of people. All species of the parasites are to be found in Greece. In our own studies the mild tertian parasite occurred most frequently, the so-called malignant species next commonly, and the quartan least of all—but not rarely. As I have said, blackwater fever, the worst form of malaria, has been very common in Greece. Regarding the species of Anophelines, which carry malaria in the country, Dr. Savas told me that out of 1,839 of these insects, 1,778 were found to be *Anopheles maculipennis*, 21 to be *Anopheles bifurcatus*, and 20 to be *Pyretophorus superpictus*, all well-known agents of the disease.

Now, what must be the effect of this ubiquitous and everlasting incubus of disease on the people of modern Greece? Remember that the malady is essentially one of infancy among the native population. Infecting the child one or two years after birth, it persecutes him until puberty with a long succession of febrile attacks, accompanied by much splenomegaly and anaemia. Imagine the effect it would produce upon our own children here in Britain. It is true that our children suffer from many complaints—scarlatina, measles, whooping-cough—but these are of brief duration and transient. But now add to these, in imagination, a malady which lasts for years, and may sometimes attack every child in a village. What would be the effect upon our population, especially our rural population—upon their numbers and upon the health and vigour of the survivors? It must be enormous in Greece. People often seem to think that such a plague strengthens a race by killing off the weaker individuals; but this view rests upon the unproven assumption that it is really the weaker children which cannot survive. On the contrary, experience seems to show that it is the stronger blood which suffers most—the fair, northern blood which Nature attempts constantly to pour into the southern lands. If this be true, the effect of malaria will be constantly to resist the invigorating influx which nature has provided; and there are many facts in the history of India, Italy, and Africa which could be brought forward in support of this hypothesis.

We now come face to face with that profoundly interesting subject, the political, economical, and historical significance of this great disease. We know that malaria must have existed in Greece ever since the time of Hippocrates, about 400 B.C. What effect has it had on the life of the country? In pre-historic times Greece was certainly peopled by successive waves of Aryan invaders from the north—probably a fair-haired people—who made it what it became, who conquered Persia and Egypt, and who created the sciences, arts, and philosophies which we are only developing further to-day. That race reached its climax of development at the time of Pericles. Those great and beautiful valleys were thickly peopled by a civilisation which in some ways has not since been excelled. Everywhere there were cities, temples, oracles, arts, philosophies, and a population vigorous and well trained in arms. Lake Kopais, now almost deserted, was surrounded by towns whose massive works remain to this day. Suddenly, however, a blight fell over all. Was it due to internecine conflict or to foreign conquest? Scarcely; for history shows that war burns and ravages, but does not annihilate. Thebes was thrice destroyed, but thrice rebuilt. Or was it due to some cause, entering furtively and gradually sapping away the energies of the race by attacking the rural population, by slaying the newborn infant, by seizing the rising generation, and especially by killing out the fair-haired descendant of the original settlers, leaving behind chiefly the more immunised and darker children of their captives, won by the sword from Asia and Africa?

Those who have read Dr. W. North's fascinating book on "Roman Fever" (Sampson Low, Marston and Co., 1896) will remember the suggestion that the depopulation of the Campagna was due to the sudden introduction of malaria by the mercenaries of Sylla and Marius, and so recently as 1866, as we know from the works of Dr. Davidson, of Edinburgh, malaria entered and devastated the islands of Mauritius and Reunion, either the mosquito or the parasite having been then brought in from without. Similarly, could it not have been introduced into Greece about the time of Hippocrates by the numerous Asiatic and African slaves taken by the conquerors? Supposing, as is probable, that the Anophelines were already present, all that was required to light the conflagration was the entry of infected persons. Once started, the disease would spread by internal intercourse from valley to valley, would smoulder here and blaze there, and would, I think, gradually eat out the high strain of the northern blood.

I cannot imagine Lake Kopais, in its present highly malarious condition, to have been thickly peopled by a vigorous race; nor, on looking at those wonderful figured tombstones at Athens, can I imagine that the healthy and powerful people represented upon them could have ever passed through the anæmic and splenomegalous infancy (to coin a word) caused by widespread malaria. Well, I venture only to suggest the hypothesis, and must leave it to scholars for confirmation or rejection. Of one thing I am confident, that causes such as malaria, dysentery, and intestinal entozoa must have modified history to a much greater extent than we conceive. Our historians and econo-

mists do not seem even to have considered the matter. It is true that they speak of epidemic diseases, but the endemic diseases are really those of the greatest importance.

The same cause works the same evil in modern Greece. Though the country has been freed from the Turks for seventy years, and enjoys what is considered to be (though personally I doubt it) the best form of government, yet its population has not increased very much. Athens has about 130,000 inhabitants, and Patras, the next largest city, about 40,000; and the other towns are scarcely more than large villages. The rural areas contain small and poor, but not destitute, hamlets; but what strikes one most in them is the absence of villas and of large hotels. Few of the wealthier people seem to live in the country. A gentleman of Athens told me that he bought a shooting-box, but that he was attacked by malaria when he went to stay there. The inns are comparatively small and shabby, and not likely to be frequented by many modern tourists, and the methods of communication are primitive. This is very surprising, because one would think that such a country would be the Mecca of all the tourists of Europe and America, who would pour their millions of pounds into it, just as they do into Switzerland. But, of course, the reputation of unhealthiness possessed by many of the rural tracts is fatal; the tourist thinks twice about going to them, and the innkeeper hesitates about spending his capital in a locality where he and his children may expect to be frequently ill.

The whole life of Greece must suffer from this weight, which crushes its rural energies. Where the children suffer so much, how can the country create that fresh blood which keeps a nation young? But for a hamlet here and there, those famous valleys are deserted. I saw from a spur of Helikon the sun setting upon Parnassus, Apollo sinking, as he was wont to do, towards his own fane at Delphi, and pouring a flood of light over the great Kopais Plain. But it seemed that he was the only inhabitant of it. There was nothing there. "Who," said a rich Greek to me, "would think of going to live in such a place as that?" I doubt much whether it is the Turk who has done all this. I think it is very largely the malaria.

Now, regarding the remedy. Science has, of course, shown absolutely that the disease is carried by gnats, and, in doing so, has indicated several methods of prevention. First, there is the method of excluding gnats by the careful use of mosquito nets and wire gauze screens to the windows—useful for the houses of the rich, but too costly and troublesome for the poor. Then there is the method of Koch, the cinchonisation of all the patients, by which they themselves are benefited, while the gnats do not become infected and therefore do not spread the parasites; but this implies rigorous dosing with quinine for months—a thing which patients and the mothers of children will not submit to. But the method which I first suggested and elaborated in 1899, namely, the reduction of mosquitoes, is the one which I prefer, and the one which, after seeing the conditions in Greece, I prefer more than ever. It is, of course, the old Roman plan of drainage against malaria, with this important differ-

ence, that we are now no longer compelled to drain the whole surface of a malarious area, but only those small pools in which the *Anophelines* breed. This method has the immense advantage that it can be carried out by local authorities without troubling the people; while in the end it is sure to be more economical and lasting in its effects than other methods which, I think, are apt to cause waste both of money and effort. To Greece it is most especially applicable. There, the rainy season is the winter, when the mosquitoes do not breed; so that in the arid summer they can find only very few suitable breeding pools. So much the easier and cheaper will it be to treat these. They can be rendered uninhabitable for the larvæ by drainage, by filling up, by deepening, by dragging the weeds, and in the last resort by periodic oiling. Where carried out with intelligence and loyalty, as in Havana, the Federated Malay States, and Ismailia, the work has proved comparatively easy and cheap, while the results (now so well known) have been of the most brilliant kind. I think that Greece, owing to the scarcity of surface water suitable for the larvæ in the summer, will be easier to deal with than any of these places—easier even than Ismailia, with its irrigation system. It will be strange indeed if so intelligent a nation cannot carry out such simple measures in order to rid itself of a plague which has oppressed it for ages.

The Grecian Malaria Society has commenced the work with energy. It has investigated local conditions; has issued numerous tracts to the people; has urged railway companies to screen stations, and Government to undertake drainage. Dr. Savas suggests Government regulation of the sale of quinine in order to improve and cheapen the drug—a most necessary item. At Athens, where malaria exists only along the bed of the Ilissos, the stream has been "trained" in many places. Presently I hope we shall see a survey made of the malaria and the local breeding places in the whole of Greece, preparatory to a general onslaught on the foe. When I was in Athens I had the pleasure of speaking to M. Theotakis, the Premier, and Mr. Boufidis, the President of the Chamber, and am sure that the Government will do its best to support the campaign. But the Society will have to fight many enemies, chief among which will be the incredulity and indifference of the public. I have therefore suggested that we in Britain may help it by doing something to show our support of it. The Liverpool School of Tropical Medicine has accordingly offered its assistance, which has been accepted by the King of Greece; and under the patronage of H.R.H. Princess Christian, we have opened a list of supporters, which now includes many eminent names, beginning with those of the Greek Minister in London, the British Minister in Athens, the Presidents of the Royal Society and the British Academy, the Royal College of Physicians, and many Greeks residing in Britain. It often happens that a little foreign support will do more to encourage a cause than much local effort can do. If any of you wish to join us we shall welcome you most heartily. You have but to write a note to me or to our Secretary, A. H. Milne, Esq., B10, Exchange Buildings, Liverpool.

When matters are in proper train, every year will

see the removal of a number of the little marshes which are so injurious to the country—every year will see a decrease in the malaria. I venture to say with confidence that, give us but the necessary means—and we do not require much—there is no country in the world from which we could not extirpate the disease. Hitherto we have contented ourselves with diminishing it in isolated towns. Let us now deal with whole nations. Remember that it has actually been banished from Great Britain, almost by unconscious agencies. We have only to imitate those agencies consciously. What a triumph it will be for that great science, of which all of us are the humble votaries, if she can wipe out this miasm, this defilement, from an entire country. I will not hesitate—such is our ambition. And that country is Greece.

I asked a Greek friend why his countrymen did not restore the Parthenon. He replied it was because they were unwilling to touch the sacred ruins without the assent of the whole world, to whom they belonged. So also Greece belongs to the whole world. We all share in her troubles and should do our best to relieve them. Many years have passed since Byron gave his life for Greece. He attributed her misfortunes to loss of liberty. Perhaps so; but I think that an enemy more inveterate than the Turk has also destroyed her. Not least among the nations, Britain has studied to help her against her human enemies. Should we not help her now against the more potent enemy which we have discovered. That Science which, more than two thousand years ago, she created is at our side urging us on. We have no doubt of the result—we need only to nerve the arm to strike.

Gentlemen, it was my good fortune to stand the other day at a spot from which can be seen within eyeshot the birthplaces of science, art, philosophy, the drama—of Europe, of our modern civilisation. It was a great rock rising in the midst of a city built on a plain—not a boundless uninteresting expanse, but a plain, defined as such by a cincture of beautiful mountains. I have known many of the loveliest scenes of this wonderful earth, but nothing altogether equal to the Attic plain. The rock was the Acropolis; and the setting sun flooded it with light. Upon it rose those ruins which are unsurpassable, unpaintable and indescribable, because they were built, not only for themselves, but for the visions which surround them—the Propylæa, the Erechtheion, the Parthenon. And who was the god for whom that temple was built—which of all those gods, who are not dead as some imagine, but who live now and will live for ever until, as the poet says, "the future dares forget the past"—who live because they are the everlasting types of our own spirit? That goddess whose birth and victory were recorded on the pediments of the Parthenon; who sprang, not from the common zygosis of Nature, but full-armed from the head of Zeus at the touch of Fire and Toil; who conquered the Deep himself. Study her attributes, perceived and recorded in legend by the sages who lived before history was born, and we shall know her. Without human weakness, she led Ulysses through the dangers of the Deep, she gave Perseus the weapons with which he slew the monster of the Deep, she destroyed the city of the Deep, she made Athens triumph over the Deep,

and to-day has lifted man in a few centuries from the Deep to heights unimagined before—Science herself. The Parthenon was the temple of Science. The great figure of Science, standing before it, dominated the whole of Greece. At its gates, even, stood the figure of Hygeia, the Science of Health, whom we now invoke. Science is the goddess whom we serve, as did the ancient Athenians, because we know that she and she alone can save us from these elements of the Deep which oppress us. We are her servants. We honour not the baser gods—the quack remedies, the sham philanthropies, the false knowledges, the mock philosophies, the whining pities, the lying politics which keep men down in the depths. We acknowledge only the intellect which sees the truth and smites the evil. Let us pray Pallas Athena to revisit the land where she was born.

OPERATION LEUCOCYTOSIS.

By P. N. GERRARD, B.A. B.Ch. B.A.O., M.D. (Dublin),
D.T.M.H. (Cantab).

Federated Malay States.

As it falls to the lot of surgeons very rarely to profit both their patients and themselves, by what I must insist upon calling a surgical error, the case quoted below, in which both of these happy contingencies occurred, may be of interest to the profession.

Polgadu, aged 23, coolie, Tamil, male, was admitted to Parit-Buntar Hospital on May 29th, 1906, complaining of abdominal pain, and constipation for two days. The abdomen was noted as being distended and tense.

My absence at the time of his admission, on sick leave, prevented me from seeing the case until June 16th, on which date the following symptoms presented themselves:—

The patient was emaciated and evidently suffering, his complaint being entirely referred to the lower part of his abdomen. His temperature rose at night to 102°, and was usually 99° in the mornings. Bowels constipated, urine regular and healthy, save that on the day of his admission it had to be drawn off by catheterisation; his mouth was dry, and his tongue was dry and somewhat furred; his pulse was rapid and atonic.

On examination the abdomen was hard and exquisitely tender, more especially in the middle hypogastrium and bladder region, where a tenseness and an apparent tumour with ill-defined edges existed.

The patient was so ill that I decided upon an exploratory laparotomy next morning.

The diagnosis at that time lay, to my thinking, between the following:—

(1) An antero-cystic abscess; the symptoms in the last case in which I operated having been very similar to those presenting in this case.

(2) An abscess of the appendix, presenting in the median line and involving the pelvic peritoneum.

By analogy I was much inclined to the former.

The patient, after proper preparation, was placed on the table, chloroform was administered, catheterisa-

tion performed, and an incision about 2½ ins. long made in the median line about 1 in. above the pubes.

Having made the preliminary incision I cut through the layers of what I believed to be greatly thickened peritoneum (which I had expected to encounter), and in the bottom of the wound what was apparently a coil of intestine presented; as the contents of this protrusion were apparently clear, I came to the conclusion that it was a cyst or hydatid, superficial to the bladder, and incised it, when I obtained clear urine. Passing a catheter, there was no doubt left of my error. On exploring the bladder, however, an interesting condition revealed itself.

The bladder appeared to be divided into two sacs, an anterior and a posterior, or, as the patient lay, a superior and an inferior, the superior being practically cut off or delineated from the inferior by the presence of an oval tumour, formed apparently by distended peritoneum pressing against the posterior surface of the pubes.

The bulging peritoneum contained at least fluid, if not pus, and nothing remained for me to do except to suture carefully the bladder wound, to tie in a catheter for drainage, and to proceed to the major undertaking of opening the peritoneum just below the umbilicus.

I had hardly completed the cystic suture when the patient ceased to breathe, the pulse became intermittent, and all the signs of impending death occurred. Strychnine and ether were promptly administered, and I had already commenced artificial respiration by thoracic pressure, but as no response was apparent I started to respire by the Silvester method; this, to my surprise, could not be carried out, as all the patient's muscles were in a state of tonic contraction. The dose of liq. strychnine administered was 4 minims. I continued for about ten minutes the intermittent thoracic pressure, but as the pulse apparently failed, respiration showed no signs of becoming re-established, and the pupils became fixed, I gave the case up as dead, and went to wash my hands, full of vain regrets and disappointment. Before thirty seconds had elapsed, however, respiration recommenced, the pulse returned, and the patient became sufficiently well to be removed to his ward, but not, in my opinion, sufficiently recovered to proceed to the completion of the operation.

Owing to a sudden outbreak of cholera in the district some miles away I was unable to see my patient until Monday, the 18th. His temperature had fallen to normal I found, after the operation, and had remained normal, his abdomen was soft, and he was free from pain, his general condition was good, and he asked for full diet; his pulse was good, his tongue clean, the bladder had acted normally, and he appeared to be on the road to recovery from all his ailments.

The case made an uneventful recovery, and primary union of the bladder and of the superficial wound took place. He left hospital, fat and well, about three weeks after his operation.

I believe the symptoms to have been due to an atonic and distended anterior portion of the bladder, that peritonitis with effusion was present in the first instance, and that the case was cured by a determina-

tion of blood supply, and a concomitant local leucocytosis to the pelvis.

This case might well suggest, in these days of cleanliness, a more frequent exposure of the peritoneum in cases of effusion from any cause, with a view to the absorption of the fluid by means of stimulation of the pelvic lymphatics and blood supply.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

DEAR SIRs,—I beg to forward an account of an epidemic of dengue which attacked Port Sudan this year—Port Sudan being a new town, and the seaport of the Sudan.

I may say that dengue fever does every year show itself at Suakim, although not there located in the text-books. We have had also this year a very sharp outbreak of quinine dengue at Halfa. I presume that it made its way along the new Suakim-Atbara Railway to this inland town.

There are so many fevers out here, diagnosed as simple fever, simple continued fever, sun fever, local fever, &c., that it is a relief to get one disentangled and nailed down and labelled, so to speak. There is another Sudanese fever, although rather a twenty-one days' fever than an eight day, which may be mistaken for typhoid (but it is without abdominal symptoms), or Malta fever (but it is without throat or joint symptoms); it relapses, however, and differs from malaria, in that it does not yield to quinine.

It might be called low tropical fever, for it requires change of locality for its cure. It also requires naming. It is, I think, different in its temperature chart from the typhoid type, in that the fever is rather of the intermitting type than the remitting.

Yours faithfully,

J. B. CHRISTOPHERSON, M.D., M.R.C.P., F.R.C.S.,
*Director Sudan Medical Department and
Physician to H.E. the Governor-
General of the Sudan.*

Sudan Government,
Medical Department, Khartoum,
September 25th, 1906.

DENGUE IN PORT SUDAN—RED SEA PROVINCE, SUDAN.

By SELIM SAIGH, M.D.

Medical Officer in Sudan Medical Department.

THE disease appeared this year as an epidemic in Port Sudan, the new seaport of the Sudan. The first case entered the hospital on May 29th, 1906. From that time it increased rapidly, affecting one part of the town, then the other, so that by the end of August a very large number had been attacked.

It affected equally white and coloured people, and both sexes, and men of every age, except young infants. One attack did not confer immunity, many patients having more than one attack. The incubation period was from two to four days.

Etiology.—Probably the carrier of dengue is the mosquito. The present epidemic affected chiefly the houses where it was found, and the disease re-

appeared when there was an increase of mosquitoes in the town.

It was especially remarkable that all people living in the hospital escaped, though by that time the wards were full of cases of dengue. The hospital was the only place free from mosquitoes: though we were very careful to destroy the larvæ present in our water; this was the only precaution that was taken.

Onset.—The onset is very sudden, usually coming on in the afternoon. Prodromata are rare, and when present they consist of headache, anorexia and rheumatic pains. The disease is rarely ushered in by a chill. A patient describing his attack said: "I have been out to work all day, feeling the same as usual; about sunset I had headache, and feeling tired I sat on a chair to rest; suddenly I began to have pains all over, and half an hour later, when I had to go home, I was so stiff that two men had to support me all the way home."

Such onsets are very common, and it is usually in such a manner that the disease begins. The fever then develops rapidly, and with it the headache, and the pains in the neck and eyeball increase; the pains in the loins, thighs, knees, and calves are very characteristic and are almost always present; in a word, all the body is stiff, and the least movement is painful; during the night the patient is unable to sleep and very restless.

Circulatory System.—Dengue does not affect the heart except by raising the pulse from 90 to 120, and in very severe cases to 130. Sometimes there is profuse epistaxis, and this often relieves the headache and brings down the fever.

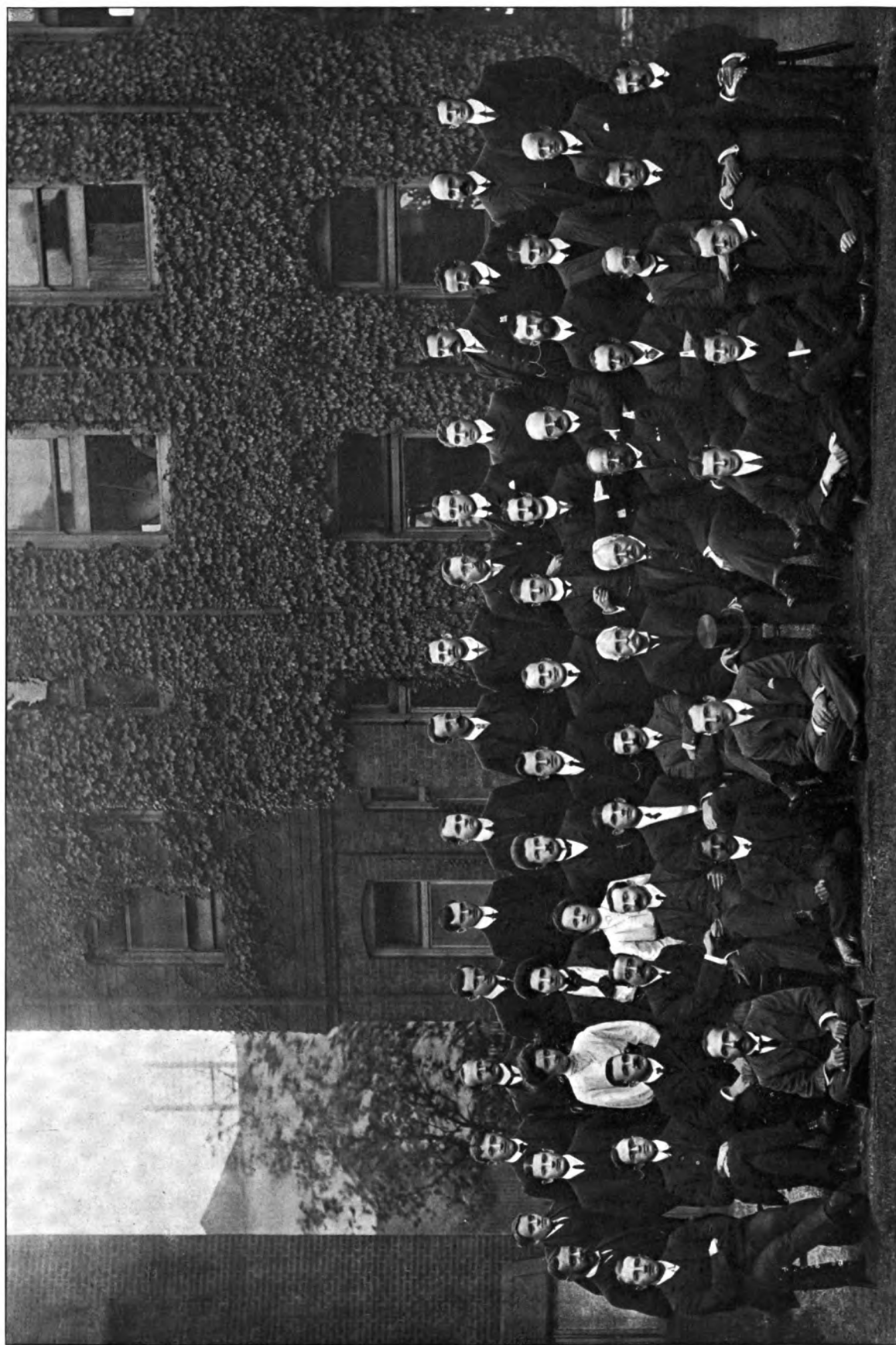
Respiratory System.—The most important difference between influenza and dengue lies in the fact that the latter does not give rise to pulmonary symptoms. There might in some cases be a mild laryngeal catarrh and bronchitis. The respiration during an attack of dengue is accelerated.

Digestive System.—There is often with the first symptom very severe pain in the stomach, with vomiting, but these usually subside after the first two or three days. The tongue is coated during the attack, and begins to clear when the fever falls: there is a complete loss of appetite. During the first three or four days there is constipation, which is sometimes followed by diarrhœa, in some cases persisting for a time after the attack has subsided.

Spleen and Liver.—The liver and spleen are not affected; in two cases there was an enlarged spleen, but this was probably due to the fact that the patient had malaria before.

In the beginning of an attack there is often a deep flushing of the face, but the real eruption does not begin until the third or fourth day. It is present in most cases, and consists of roseolæ of the size of a pin's head, dark in colour, coalescing and forming patches of different sizes; this eruption affects the face, neck, back, forearm, and hands, in some cases extending to the thigh. The eruption begins to fade when the fever goes down, and in a short time the skin desquamates, peeling off in small flakes.

Kidney and Urine.—In the great majority of cases the urinary system is not affected, a few patients had albumin, and all of these had an attack of epistaxis.



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Absent: A. H. Reid, P. R. Egan.

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22nd Session.

October-December, 1906.

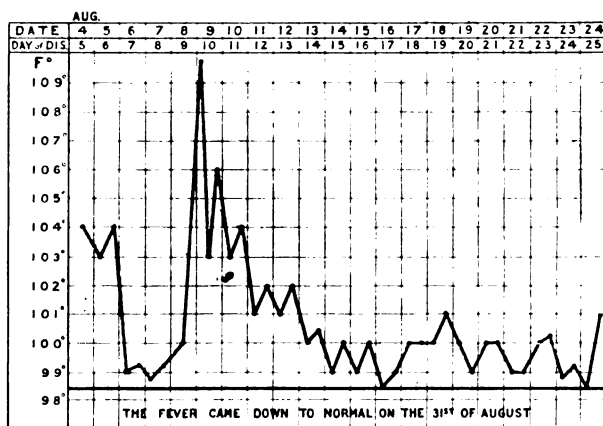
Take and Danielsson, Ltd., London.

Nervous System.—The pains in the head, neck and eyes are the only troubles set up in the nervous system.

General Course of the Fever.—After the onset the fever increases rapidly, rising as high as 103° or 104°, and is continuous in character, there being not more than one degree difference between the morning and the evening temperature. With the increase of the fever all the symptoms augment in severity; this goes on for five or six days, the fever falls then by crisis, usually in the afternoon. The pains and the rash then begin to disappear, and the patient becomes convalescent.

In mild cases the fever falls to normal in the second or third day, such cases have mild symptoms, but in severe cases, especially when there are complications, the fever is protracted, falls by lysis, and recovery is very slow.

An attack leaves the patient very weak and debilitated, the pains in the thigh, knees and calves may persist for some time, rendering motion painful and difficult, but gradually the tongue gets clean, the appetite improves, and the patient is able to resume his work.



Hyperpyrexia in a Case of Dengue.

Complication.—The most severe complication is hyperpyrexia, but luckily it is a rare one, and appearing in the very hottest part of the year; in these cases the patient, after a protracted attack of dengue, suddenly develops hyperpyrexia, the temperature rising as high as 108° or 109°, this sudden attack usually happens between 1 and 3 p.m., a comatose condition supervenes, with a very weak pulse and stertorous breathing; if he is able to survive the high temperature he will probably have another rise in the evening, but this time only to 105° or 106°. The next day his temperature reaches 104°, falling down very slowly by lysis. Such attacks are always followed by severe bronchial catarrh, their duration is very protracted, leaving the patient weak for a long time.

Mortality.—Only two cases died of dengue, both of them Europeans. Both had long standing emphysema. After a protracted attack they developed hyperpyrexia with all its concomitant symptoms, and succumbed in a very short time.

Death was caused by asphyxia, as the bronchi were full of mucus, rendering respiration impossible. Probably hyperpyrexia, due to the fact that the disease affects the brain and meninges. The other complications have already been mentioned. They consist of rheumatic pains, epistaxis, and, rarely, albumin in the urine and bronchitis.

Diagnosis.—The only disease which resembles dengue is influenza, but the roseolar eruption, the lack of pulmonary symptoms and the rheumatic pains render the diagnosis easy.

Treatment.—The disease has a special course to follow, and there are medicines to help it abort, or cut it short. I found that the following prescription is effective by relieving the pains.

R Sod. salicylate 10 grs.
Sod. bicarb. 10 grs.
Tinct. aconit. 2 mins.
Aqua. 1 oz.

Liniment of belladonna and stimulants applied externally might also relieve the pain. As to hyperpyrexia, immediate sponging with ice till the temperature falls to 99° or 100°, with strong doses of strychnine; this is to be repeated if the temperature gets higher again. As a tonic nux. vom., quinine, and iron, are necessary during convalescence when the attack has been severe, followed by change of climate as soon as the patient is able to move.

“Lancet,” October 20, 1906, p. 1,064.

“A NEW ASPECT OF THE PATHOLOGY AND TREATMENT OF LEPROSY.”

Black, Dr. Robert Sinclair. In a short but extremely suggestive and interesting paper, the author details some conclusions he has reached during seven years' experience of the Cape Government establishment for the isolation of lepers on Robben Island.

Dr. Black entirely disbelieves in Mr. Jonathan Hutchinson's fish-eating theory of the disease, and appears to regard contagion as the only possible method of communication. He believes that in most cases the bacilli first attack the nasal mucosa, causing a mild chronic rhinitis which is rarely if ever noticed by either the patient or his medical attendants as a symptom of leprosy.

It is in this condition that the disease is usually communicated to others, and Dr. Black believes that the early recognition and treatment of this condition would go far to limit the spread of the disease, not only to others, but also within the tissues of the person already attacked, believing that the lesions are at first superficial and probably remediable by surgical measures.

He further believes that leprosy erythema is caused by a toxæmia, the toxins being, however, derived not from the leprosy bacilli, but from the abundant staphylococci and streptococci which are always to be found in leprosy ulcers.

“Munch. Med. Woch.,” July 24, 1906.

AGAR-AGAR IN CHRONIC CONSTIPATION.

What seems far-fetched physiological reasoning has been applied to the treatment of chronic constipation. Agar-agar in one or two tablespoonfuls with (when it is called regulin) or without cascara, is administered daily for a few days until the bowels act, when it is gradually reduced to a teaspoonful. The idea is that the agar-agar swells in the intestine, and promotes peristalsis by the bulky nature of the contents it induces.

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THE

Journal of Tropical Medicine

NOVEMBER 15, 1906.

THE CASE OF THE INDIAN HOSPITAL ASSISTANTS.

Not long ago we had occasion to note the dissatisfaction of the vernacular students of the Lahore Medical School with the conditions under which they worked, and it was pointed out that the agitation could not in any sense be described as factious, as it was undoubtedly based on legitimate causes of dissatisfaction.

The last received issue of the *Pioneer Mail* now brings us the news that "the Medical School Club of Agra, acting on behalf of all medical students and Hospital Assistants, has issued a number of memorials to all the provincial heads of the medical departments in India, praying for an amelioration in the pay and prospects of a class of public servants who, in the opinion of the Club, do not enjoy that measure of official consideration and patronage to which they are entitled. The complaint is confirmed by the various official reports, which agree in emphasising the necessity of raising the status of Hospital Assistants. In spite of these repeated representations, however, nothing seems yet to have been done. It is stated that the demand on the services of hospital assistants has of late grown beyond their ability to meet it. In many cases, owing to the outbreak of plague, cholera, or

some other epidemics, their leave of absence is stopped, while even normally their pay scarcely corresponds to the amount of work expected from them."

It will be observed that the memorialists are acting in a perfectly moderate and constitutional manner, in pleasant contrast with the methods usually adopted by the Indian college youth when he thinks himself aggrieved; and, apart from the traditional loyalty of the Hospital Assistant class, this may be taken as an indication of their conviction of the goodness of their case.

It cannot be denied that the class is wretchedly paid in proportion to the amount and responsibility of the work expected of it, and the scale of remuneration, moreover, compares ill with that accorded to public servants, drawn from a similar class of Indian society, belonging to other departments.

The pay of civil Hospital Assistants "with English qualification," i.e., if capable of reading and writing English, commences at Rs. 25 *per mensem*, and rises to Rs. 55 (or from £20 to £44 *per annum* about.)

In the executive branch of the Civil Service, the "Teshildars," whose nearest European representatives would be French *maires*, commence at Rs. 50 and attain to Rs. 250 *per mensem*, equivalent to £40 to £200 *per annum*. In the forest department the pay of the corresponding subordinates, or "Rangers," commences at Rs. 50, and reaches Rs. 150, with the probability of promotion to "Extra Assistant Conservator," drawing, in the highest grade, Rs. 350, or about £280 *per annum*. In the police department, the pay of inspectors runs from Rs. 50 to Rs. 200 *per mensem*.

Now, the Hospital Assistant class are undoubtedly fully the equals of the members of the contrasted departments in intelligence and education, and are drawn from much the same strata of native society, those, in fact, which most nearly correspond to our "middle classes."

The teshildars, no doubt, usually belong to more influential families than those from which the other departments are recruited, but are in no way superior in education and intelligence, while, on the other hand, the inspector of police is usually promoted from the ranks, and though selection for promotion doubtless implies ability above the average, they are often of humbler social origin than the medical subordinate. Like the hospital assistants, the subordinates of the forest department are specially trained in a Government college, mainly at the public expense.

It is difficult to see any just reason for this extraordinary difference of treatment, for it will be seen that the medical subordinate's pay finishes pretty much about the scale at which the others commence, but the depreciation of medical work runs right through all branches of the department, the pay of assistant surgeons, though fully qualified medical men, comparing almost as poorly with that of the corresponding "Extra assistant commissioner" of the executive Civil Service. The excuse given would probably be the old tale of emoluments gained in private practice, but on this matter the hospital assistant, in common with all other exponents of the European system of medicine, has been hardly hit by the wave of unpopularity and distrust that has possessed native society against all its professors as the outcome of plague and the

measures adopted to cope with it; and it is probably this circumstance that has brought the service to the stage of petitioning Government for better treatment.

Even allowing for the cheapness of living in India, Rs. 25 per mensem is starvation pay for a man who has been raised by education to an entirely different standard of civilisation from that of the ordinary coolie, and it is no better than cruelty to take an Indian lad, and after converting him into a civilised and thinking man, to pay him somewhere about the wages of a decent butler or cook. It must not be forgotten that practically all are married men with families.

During the recent troublous times of famine and plague in India, the loyalty and pluck of our medical subordinates has been above all praise. They undoubtedly form the backbone of our system of medical relief, and we trust that the powers that be will turn a sympathetic ear to the petition alluded to in our Indian contemporary, and will do something to alleviate the hardships of a hardworking and estimable body of men.

AN APOLOGY.

I REGRET to learn that the letters and notices concerning the memorial to the late Professor Schaudinn were inserted in the JOURNAL OF TROPICAL MEDICINE of November 1st, under a misapprehension. It appears that the letters I received were intended for private circulation only, and those who have charge of the memorial in this country are deeply concerned that the letters were published. Seeing that the letters were printed and not marked private or confidential, it did not occur to me that they were not public property.

I beg to apologise for the error I made in publishing the correspondence, but it was done with the intention of advocating the cause so many of us have at heart, namely, a fitting testimony to the memory of a man all must revere. I write this in the first person as I did not consult any of my colleagues on the matter, believing that it was a matter of public duty to publish the letters at the earliest possible date. It falls to me personally, therefore, to make my humble apology.

JAMES CANTLIE.

MALARIA IN GREECE.—PROPOSALS FOR ANTI-MALARIAL MEASURES.

(Issued by the Liverpool School of Tropical Medicine.)

PROPOSAL FOR FIGHTING MALARIA IN GREECE.

DEAR SIR,—The Chairman and Committee of the Liverpool School of Tropical Medicine, in publishing the annexed appeal for subscriptions in aid of the Grecian Anti-Malaria League, wish to state:—

(1) That in reply to a telegram from the School, H.M. the King of Greece has signified his acceptance of any help that the School can give to the League of which he is the Patron.

(2) That H.R.H. Princess Christian, Honorary President of the School, has graciously consented to be the Patroness of the subscription in Great Britain.

(3) That Sir Francis Elliot, G.C.V.O., K.C.M.G., H.B.M., Minister at Athens, has kindly promised to receive the amount subscribed, and to hand it over to the Grecian Anti-Malaria League.

(4) That support to the scheme has already been promised by those whose names are printed in the accompanying list.

(5) That subscriptions may be paid to the Secretary, Liverpool School of Tropical Medicine, B10, Exchange Buildings, Liverpool.

ALFRED JONES,

Chairman, Liverpool School of Tropical Medicine.

The Liverpool School of Tropical Medicine, B10, Exchange Buildings, Liverpool.

July, 1906.

MALARIA IN GREECE.

By RONALD ROSS, C.B., F.R.S.

Professor of Tropical Medicine, University of Liverpool and Liverpool School of Tropical Medicine.

A LITTLE while ago I was asked by the Lake Kopais Company to make a study of the malaria which has long been prevalent on their estates in that part of Greece. Permission being granted by this University and School, I went there last May and carried out the required investigation. It revealed an unexpectedly high degree of malarial infection in most of the localities examined. Moreover, I ascertained from members of the Grecian Anti-Malaria League that the district of Kopais is by no means exceptional in this respect, and that the malady is very prevalent in many rural areas throughout the country. The League, which has existed for some years, has been doing its best to improve matters by modern methods, but is much hampered by lack of funds. After consideration, therefore, I have come to the conclusion that the case is one in which a little assistance from this country may do a great deal, and that we might well be justified in attempting to raise some small subscription among Greeks and other lovers of Greece resident in Britain, for the purpose of supporting so deserving a body.

Details regarding the prevalence of malaria in Greece are as follows: Professor Dr. Savas, Physician to H.M. the King of Greece and a Vice-President of the League, informed me that, taking the statistics of the larger towns for a basis (probably the lowest possible basis), the average annual number of cases must be something like 250,000, and deaths about 1,760. He said also, that malaria was particularly prevalent in Greece last year, the number of cases being perhaps half as numerous as the population.

From Dr. Kardamatis, General Secretary of the League, I obtained the following figures for last year:—

Estimated population of Greece	... 2,433,806
Estimated number of cases of malaria	960,048
Estimated deaths from malaria	... 5,916

It is always difficult to arrive at any exact estimate of the amount of malaria in any country; but these data appear to have been collected with all due care, and are certainly serious and startling enough for a European nation. It would appear that in a single year, there were roughly two attacks for every five persons in the country. Fortunately malaria, though

it is an extremely troublesome malady, is not often fatal; yet one in about every 410 persons seems to have died of it last year alone. I was informed also that black-water fever, the most fatal form of the disease, often occurs in certain rural areas.

I will now describe my own experiences. It will be remembered that the Kopaic Lake was a large stretch of fresh water situated north-west of Boeotian Thebes at the feet of the slopes of Parnassus and Helikon. It was frequently drained by the ancients, and as frequently allowed to lapse again into the condition of a large marsh (in winter). Recently it has been kept well drained by the British Lake Kopais Company, the surface of the large plain so formed being used for extensive cultivation. On the margin of the plain there are a number of villages, some of which were examined by Dr. Kardamatis and myself, with the valuable assistance of Mr. D. Steele, agent of the Lake Kopais Company in Greece. The first method which we adopted for estimating the amount of malaria present was one which gives very reliable results when used with proper scientific precautions—namely, an examination of the people, chiefly the children, for enlargement of the spleen. Our general result was as follows: Out of 373 people examined enlargement of the spleen was observed in 96, or 23 per cent. But, in considering this ratio it must be remembered, first, that enlargement of the spleen is indicative, not only of a malarial infection, but generally of a long continued one; and, secondly, that the investigation was carried out in May and June, that is before the commencement of the annual autumnal malaria season. There is no doubt that an autumnal investigation would have disclosed a ratio of infection much higher even than this.

To give further details—at the village of Moulki, which is situated near the ancient Haliartos on the Kopaic Plain itself, we examined 80 persons and found enlargement of the spleen in no less than 38, or nearly half. At the village of Mazi, on the slopes of Helikon, just above Haliartos, we found it in 13 out of 40. At Skripou (the ancient Orchomenos) situated on the edge of the plain, it occurred in 25 out of 50 school children—exactly half. At the town of Livadhia, although it is at a distance from the Kopaic Plain and some way up the slope of Helikon, and is watered by running streams rising near the ancient Oracle of Trophonios, enlargement of the spleen was found in no less than 16 out of 100 school children. On the other hand, on the Kadmeia of Thebes, it occurred only in one out of 50 children.

Another method of estimating the amount of malaria present, namely, by searching preparations of the finger blood of the people for the parasites which cause the disease, need not be referred to here as the examinations are not yet complete; but so far as they have been carried they fully confirm the spleen-test, which of itself is sufficient for Greece. All the kinds of parasites have been readily found; and there can be no possible doubt regarding the wide prevalence of the disease. Many of the unfortunate little children, as they filed past us in the schools, presented a sad spectacle—pale and wizened, with enormously enlarged spleens and frequent attacks of fever. I have seen nothing worse in the most malarious parts of India;

and nothing so bad in Africa, where there is probably more racial immunity. I suspect that there is a much larger infantile mortality in Greece than is shown by the statistics; and also that the adults, partially immunised as they are, cannot but lose in health and vigour in consequence of the unhealthy childhood which they must frequently pass through.

The question as to how far malaria has influenced the past history and the modern development of Greece, is one of the greatest interest, and will, I hope, receive future consideration. We must remember that nearly the whole surface of the country is mountainous, the arable tracts consisting of but a few small valleys or plains, maintaining most of the rural population. Yet it is precisely in these vital areas that the disease is most prevalent. True, some of the larger towns seem to be much less affected; but a nation can scarcely depend for its prosperity on its urban population alone. It is difficult to see how a vigorous country life can exist under the conditions which I have attempted to describe. One would expect to see many villages, churches, inns and country houses scattered about the landscape. The villages are few and poor, the country houses almost entirely absent. A gentleman in Athens told me that he bought a shooting box, but that when he went there he was immediately attacked by malaria. One would expect also to find plentiful accommodation for travellers all over a country where almost every hill, rock or stream is sacred to literature, art and history—which should be visited annually by thousands of tourists from all parts of the world. In reality we now see throughout these great valleys little more than what may almost be called scenes of desolation—bare hills, empty plains, a poor and scattered population.

Many years have passed since Byron gave his life for Greece. He attributed her misfortunes to loss of freedom. Is it possible that an enemy more inveterate than the Turk, has been really the cause of them? Looking at those poor children in the villages I feel inclined to think so.

Britain has done something for Greece in the past; and may now help her again, and perhaps in a more effective manner. Science has at length taught us how to combat malaria on a large scale. Ismailia, Havana, the Campagna, Hong Kong, Khartum, the Federated Malay States, give conclusive evidence of this; and so far as my own experiences teach me, the task in Greece will be a comparatively light one. Owing to the dryness of the climate and to the fact that the heavy rains fall in the winter, pools of water suitable for the propagation of the malaria-bearing gnats seem to be so small and isolated that they could easily, I think, be rendered uninhabitable for the insects; while the people are so intelligent that they are likely to accept readily enough the numerous other anti-malarial measures which may be adopted. Indeed, I will venture to say, that if the work is undertaken with the same degree of intelligence and persistence as was shown in the places just mentioned, the disease ought to be nearly banished from Greece in five years, and, moreover, at comparatively little cost. Such a result would be a most glorious victory, not of nation against nation, but of science against one of the principal enemies of mankind.

As I have said, the Anti-Malaria League of Greece, of which H.M. the King of Greece is Patron, has already commenced the battle, and I can testify has done so in a thoroughly practical and scientific manner. Its own duties are to indicate with exactness the sources of malaria near the principal towns and villages, to advise the Greek Government regarding the necessary measures, and to rouse the people to defend themselves by the simple precautions which are now so well known to medical men. All that we have to do—citizens or lovers of Greece in this country—is to try to help the League with funds and with sympathy. The former will enable it to do the necessary work; the latter will stimulate the Greeks themselves to aid in the task. With regard to the Government of H.M. the King of Greece, I can say confidently that we may fully rely upon its sympathy with the cause, and I say this, not as a mere compliment, but as the result of impressions gained by me during interviews with M. Theotokis, the Premier, and M. Boufidis, the President of the Chamber.

In conclusion, I can say with confidence that every penny spent in this cause is sure to give immediate and lasting benefit to Greece. For every tract distributed among the people, every pool of disease-breeding water drained away or filled up, there will be a corresponding saving of health and life; and, as the work progresses year by year, the hold of malaria on that beautiful country will be gradually relaxed until it is finally loosed altogether. The disease will disappear from Greece as it has disappeared from Britain.

Translation.

THE DISTRIBUTION OF BLOOD-SUCKING INSECTS IN WEST AFRICA.

By Dr. H. ZIEMANN.

THE increase of the scientific and practical importance of the blood parasites, as regards tropical pathology, has also greatly augmented the interest taken in those animals which we know to propagate diseases of the blood. I am especially thinking of the great zeal shown in the collecting of Anopheles in all parts of the Tropics. Already in the years 1899, 1900, the writer of this paper endeavoured to collect the principal blood-sucking insects of Kamerun, Togo, and Liberia, and to urge further investigations in that direction.¹ But the untimely death of the zoologist, Muggenberg, unavoidably delayed the idea; in the meantime Theobald and Giles filled up the gaps in our knowledge of the *Culicidæ* of Africa.

In addition to the *Culicidæ* found in 1899, 1900, we are pleased to say that we also succeeded in demonstrating the presence of *Stegomyia fasciata* over wide areas; however, according to a letter received from Eysell, our species appears to differ from the specimens found in Habana. As is well known, *Stegomyia fasciata* is the transmitter of yellow fever. So far this disease

has not been found in Kamerun, but once, in 1887, it was present on the west coast, and penetrated southward as far as Old Calabar, close to Kamerun.

Dr. Grünberg was able to distinguish the following species amongst the *Culicidæ* collected by me:—

- (1) *Culex fatigans*, Wiedem.
- (2) *Culex dissimilis*, Theob.
- (3) *Culex masculus*, Theob.
- (4) *Mansonia africana*.
- (5) *Eretmapodites quinque costatus*, Theob.

Of these *Culex fatigans* is of importance as a probable transmitter of *Filaria* disease.² European *Culices*, such as *Culex pipiens* (which occurs also in Algeria); *C. nemorosus*, *C. annulatus*, &c., were not found.

Moreover, we succeeded in demonstrating the presence of piroplasmiasis in animals³ in all the domesticated animals of Kamerun, in the coast regions, and this disease may, in the case of native oxen of Kamerun, be distinguished from real Texas fever, viz., (1) by its comparative mildness; (2) by the lack of the typical pear-shaped forms of real Texas fever parasite, and (3) by the absence of hæmoglobinuria. The piroplasmiasis of asses and cats, on the other hand, took a malignant course. Later, when out in South Africa, R. Koch also described, under the name of coast fever, a malignant piroplasmiasis of oxen which has to be distinguished from real Texas fever. For this reason, earnest attention was paid to the *Ixodidæ*, in fact, to all parasites of mammals, and these were systematically collected. All stations have the duty to continue collecting and to send the material gathered to the State Hospital in Duala, which is the central station, for further use.

The difficulty of identification is very much enhanced by the fact that we may find on the same animals various species, and even different genera of *Ixodidæ*. Thus, for instance, I found on goats in Togo (Lome), *Rhipicephalus evertsi* (G. Neumann), and *Rhipicephalus simus* (C. L. Koch). I also found on oxen in Lagos, *Rhipicephalus annulatus* (Say) as well as *Amblyomma variegatum* (Fab.), on elephants in Kribi; *Dermacentor circumguttatus* (G. Neumann), and *Amblyomma tholloni* (G. Neumann). Further, in oxen in Lagos, *Hæmaphysalis parvata* (G. Neumann), and *Trichodectes sphaerocephalus* (Nitzsch). It is true, this latter parasite does not belong to the *Ixodidæ*, but to the lice, but I mentioned it here for reasons of differential diagnosis.

We may be quite sure that, as investigation goes on, the frequency of the occurrence of different species of blood-sucking *Ixodidæ*, living on the same host, will increase. Generally speaking, it is certain that the species found in Upper Guinea differ slightly from those of Lower Guinea, but *Rhipicephalus annulatus* (Say) is the species which has the widest distribution. This tick is generally supposed to be the transmitter of the malaria of oxen (Texas fever). Next in order of frequency in Upper Guinea, is *Amblyomma variegatum*

¹ Ziemann: "The *Filaria* Disease in Man and Animal in the Tropics," *Deutsche Med. Wochenschr.*, 1905.

² Ziemann: "Preliminary Report on the Occurrence of Tsetse Disease in the Coast Regions of Kamerun"; "The Occurrence of Texas Fever in the Oxen of Kamerun, and More Information Concerning Tsetse Disease and Malaria of Animals," *Deutsche Med. Wochenschr.*, 1903, Nos. 15, 16.

¹ Ziemann. "Beitrag zur Anopheles-Fauna West Afrikas," *Arch. f. Schiffs und Tropenhyg.*, 1902, Bd. vi.

to be found. It is very remarkable that I was also able to demonstrate the presence of *Amblyomma variegatum* on oxen in Bamenda, a mountainous highland, forming the hinterland of Kamerun. As a matter of fact the fauna of the further hinterland of Kamerun shows great similarity to that of Upper Guinea and the Western Soudan. In Lower Guinea, at any rate, in the coast region up to the foot of the mountains, the widest distributed genus seems to be a tick which has been named by Neumann, *Hemophysalis parvata*. In addition to this species, Neumann found on the oxen of Kamerun a *Rhipicephalus ziemanni*. Its further zoological description I leave to Professor Neumann himself.

I think that we should draw up lists of all the parasites found in each colony, till finally, by having compared and interchanged the different lists of the different European colonies, we shall be able to get at the knowledge of the distribution of the principal blood-sucking parasites. The questions put to each single colonial district for the purpose of ascertaining the diseases of its animals, should in due time be answered, and these answers communicated to the other colonies.

Thus gradually we may hope to attain our purpose and to establish a comparative pathology of the animals in the African Tropics.

These were the reasons which prompted the writer to make also a collection of the flies which are known to transmit trypanosomes. Their identification has not yet been fully carried out. I will only remark in this connection that, according to Grünberg, *Glossina longipalpis* (Wied.) and *Glossina morsitans* (Westw.), transmitting, as we know, the Nagana disease, have not yet been found in the coast regions of Kamerun, though nevertheless the infection of the domestic animals by trypanosomes is very widely distributed. In Kamerun the following are known:—

(1) *Glossina palpalis* (Rob. Desv.), which is accused of carrying the trypanosome of sleeping sickness. (Found in several places, such as Victoria, Buea, Barombi, &c.) My own investigations lead me to believe that sleeping sickness on the coast only occurs sporadically, and even then it is imported; but it occurs more frequently in the hinterland. All imported cases therefore should be carefully isolated.

(2) *Glossina fusca* (Walk.), *seu tabaniformis*, Westwood, caught in the neighbourhood of the station Johann Albrechts Höhe (where there is also a trypanosomiasis of the domesticated animals).

(3) *Glossina tachinoides* (Westw.), from the Lake Tschad, which probably transmits a sort of tsetse-disease in the hinterland. Recently I received some blood films prepared from diseased animals, but they reached me in a useless condition.

Stomoxys and Tabanidæ, however, seem to be more widely distributed than the Glossinæ. The former constitute a veritable pest in some regions, as for instance in Mungo, especially *Chrysops dimidiatus* (van der Wulp). The domesticated animals in Duala harbour trypanosomes which may be distinguished clinically and morphologically from the Nagana parasites, and my observations tend to show that these Trypanosomes may be transmitted to the domestic animals by Stomoxys, or as is probably the case in Suellaba

(Kamerun) by Tabanidæ. In the Philippines this seems to be the case as regards surra.

According to Grünberg it is possible that new species may be found amongst the Stomoxys and Tabanidæ sent from Kamerun.

The further biological investigations into the life habits and especially the breeding habits of these insects are therefore of the greatest possible importance, especially because we have to reckon on the possibility that the trypanosomes which are sucked up by the blood-sucking fly, together with the blood of the attacked animal, may be transmitted to the progeny of the insect in question. For further particulars on these practical and important questions we refer to Ziemann, "Beitrag zur Trypanosome infrage," *Centralblatt für Bakteriologie*, 1905, Heft 3, 4.

B. R.

Review.

A FEW HINTS ON THE CARE OF CHILDREN AT SEA. By Samuel Synge, M.A., M.D., M.A.O., B.Ch.(Dub. Univ.), L.M. London: J. Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, W. Price 1s. net.

This excellent little book will become popular, and if it can be brought to the notice of passengers who have children in their charge will be universally sought after. Dr. Synge has really supplied what is often jocularly referred to as a long-felt want, but in this instance the legend is absolutely true. The "few hints," not only medicinally, but on every detail of child-life on board ship, are eminently practical, and show that the author has had experience of children at sea and has thought out carefully what is necessary in the way of preparation for the voyage and for application during the voyage. The "few hints" ought to be in the hands of every mother or nurse about to proceed to sea in charge of young children, for the instructions it contains will bring comfort to many an anxious and perplexed mother who has to proceed on a voyage with her infant child.

Correspondence.

PNEUMONIC FOR THE SOLVENTS OF THYMOL.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—As the following pneumatic may prove as useful to others as it has to my dressers, I publish it in the interests of our tropical patients.

The solvents of thymol are of the greatest importance in the Tropics, where ankylostomiasis and other parasitic diseases of the intestinal tract exist in a far greater degree than at home.

The pneumatic is the word "Cottage (with one T)." The drugs represented by this word are: C, chloroform; O, oils; T, turpentine; A, alcohol; G, glycerine; E, ether.

There is no necessity for me to make any long statement on this subject, and I trust that others may profit in the comparative certainty of the non-occurrence of mistakes by the administration of solvents of this excellent drug to the same extent as I believe I have.

Krian, Federated Malay States,
October 10th, 1906.

P. N. GERRARD.

Notes and News.

MALIGNANT DISEASES IN CHINA.—Dr. J. Preston Maxwell, in practice at Eng-Chhun, Amoy, China, in his report of hospital work at Eng-Chhun in the *China Medical Missionary Journal*, May, 1906, states: "One of the features of the year's work has been the number of new growths which have come under treatment; certainly there is no lack of malignant disease in this region."

UNION MEDICAL COLLEGE, PEKING.—The Union Medical College was opened on the 14th of February, 1906. The professors and lecturers are drawn principally from the missions in the North China Educational Union and from co-operating missions. Chinese tutors are also included in the teaching staff.

The College has been established to provide well-educated Chinese with as thorough a knowledge as possible of the various branches of medicine and surgery. The degree of Doctor of Medicine will be conferred upon those students who succeed in passing the final examination.

The preliminary examinations are held in February in each year in the College. Candidates desiring to enter for the next college year should be in Peking before February 22nd, 1907, and should communicate with the Dean on their arrival.

The following are the members of the Faculty: Thomas Cochrane, M.B., C.M., Dean; Nehemiah S. Hopkins, M.D.; James H. Ingram, M.D.; George D. Lowry, M.A., M.D.; Charles Lewis, M.A., M.D.; Joseph F. Griggs, M.A., M.D.; Ernest J. Peill, M.B., Ch.B., F.R.C.S.(Edin.); Charles W. Young, B.S., M.D.; W. H. Graham Aspland, M.D., C.M., F.R.C.S.(Edin.), M.R.C.S., L.R.C.P.(Lond.), and thirteen other lecturers.

The medical course covers five years of nine months each. The year begins on or about the 20th of the Chinese first month and continues until the 20th of June; the autumn term begins on or about the 20th of September and continues until the Chinese New Year.

A CHINESE PRESCRIPTION.—Dr. W. H. Jeffreys, in an article in the *China Medical Missionary Journal* of May, 1906, gives the formula from a Chinese prescription for a cough. The prescription gives the patient's name, the diagnosis of the trouble, a statement of the condition of the pulse by which the diagnosis was made. The drugs are to be wrapped in a separate white paper and then altogether in a red sheet. The thirteen drugs are as follows: Baked barley, sugar, mashed beans, bamboo shavings, a root, another root, still another root, chalk, melon-seeds, mashed and fermented melon-seeds, a mashed pebble, some wild flowers, a broken clam shell. The ingredients are to be boiled together in a large quantity of water and drunk at one draught. Cicada shells is the great nervous sedative in China. Why the "sounding-board" of the scissors grinder (cicada) should be chosen is difficult to understand. In one respect, however, the Chinese concoction forms a pleasant contrast to European quack remedies, as it

contains absolutely nothing that could possibly do any harm to the patient, and if there be any sound basis for hydropathy, the large quantity of water swallowed might possibly be beneficial.

The Bombay Sanitary report shows a very heavy infantile mortality in the Presidency, 220 children *per mille* dying in their first year, while in the cities of Bombay and Ahmadabad the recorded figures give an infant mortality of 800 *per mille*, more than half the children born dying before they are a year old. The figures may not be particularly accurate, as registration in India is still very defective, but it is unlikely that more exact information would notably affect the proportional results.

LUDHIANA, an important city in the Punjab, is to have a modern water supply, and pipes, &c., to the amount of nearly £7,000 have been ordered from England.

ALTHOUGH diminishing somewhat in the native city, plague is increasing seriously in the cantonment of Poona, dead squirrels and rats having been found in nearly every house. An exceptional feature of the outbreak is the number of Europeans that have been attacked. The goods station master and his entire family have died and an officer of the Railway Survey Department has also fallen a victim to the disease. The deceased, it appears, picked up a squirrel which he erroneously thought to be dead, when the little animal turned round and bit him, with the result that within forty-eight hours he was removed to hospital in a dangerous condition. Government has sanctioned the expenditure of Rs. 500 on the purchase of Roux's serum, and Mr. Jacob Sassoon has given Rs. 1,000 for the same purpose.

At the instance of the Sanitary Commissioner the Government of India have instituted a modified examination for promotion for native assistant surgeons employed in the Sanitary Department, special papers on hygiene, elementary bacteriology, &c., being substituted for those on surgery and midwifery. In the case of an assistant surgeon so employed, however, reverting to the ordinary line he will be expected to pass subsequently in the subjects excluded from the special examination. This may be considered the first step towards the formation of a specialist corps of medical subordinates, and is undoubtedly a most useful and promising innovation.

A MAN sleeping under a tree on the Calcutta Maidan, was attacked by hornets and so badly stung that he had to be removed to the College Hospital, where he died in a state of collapse half an hour after admission.

THE current number of the *British Medical Journal* includes a memorandum by Captain R. Markham Turner, I.M.S., of his discovery of the presence of a tsetse-fly in Arabia. The specimen has been identified by Mr. Newstead, of the Liverpool School of Tropical Medicine, as *Glossina tachinoides*, West-

wood. In view of the constant intercourse between Arabia and the African coast, the danger of the spread of sleeping sickness to the Asiatic continent is only too obvious, in view of this discovery.

Personal Notes.

INDIAN MEDICAL SERVICES.

Arrivals Reported in London.—None.

Extensions of Leave.—Lieutenant-Colonel A. Milne, 12 m. furlough; Major W. D. Sutherland, study leave, August 6th to October 10th, 1906; Major J. Chaytor White, 1 m. medical certificate; Captain F. A. Smith, study leave, September 1st to September 30th, 1906; Captain L. P. Stephen, 2 days.

Permitted to Return to Duty.—Captain N. R. J. Ranier, Major J. Chaytor White, Captain R. E. Lloyd, Lieutenant-Colonel A. C. Younan, Captain L. P. Stephen, Lieutenant G. F. T. Harkness.

Postings.

Captain R. F. Baird officiates as Deputy Sanitary Commissioner, 1st Circle, United Provinces.

Captain E. S. Morgan, on return from leave to be Civil Surgeon, Etawah.

Captain O. Dykes officiates as Civil Surgeon, Jaunpur.

Captain Melville to be Professor of Materia Medica, Lahore Medical College.

Captain M. Mackelvie and E. H. B. Stanley, services lent to Civil Department, Bengal.

Captain J. W. Little, Civil Surgeon, Wano, is transferred to Gwalior as Residency Surgeon, his place being taken by Captain J. R. Tyrrell, now on famine duty in Rajputana.

Major M. H. W. Hayward, services placed at disposal Government of Bengal.

Lieutenant-Colonel J. Sykes, Civil Surgeon, on return from leave, to Bareilly.

Lieutenant-Colonel J. Jarratt, Civil Surgeon, on return from leave, to Fyzabad.

Major H. Austen-Smith, Civil Surgeon, on return from leave, to Bahraich.

Captain W. B. Turnbull, Officiating Civil Surgeon on return from leave, to Banda.

Major W. Selby, Civil Surgeon, from Bareilly to Sitapur.

Major C. Milne, Civil Surgeon, from Fyzabad to Gonda.

Civil Surgeon Man Mohan Das, on being relieved, from Bahraich to Hamirpur.

Military Assistant Surgeon W. J. A. Hogan, Civil Surgeon, on being relieved, from Banda to Pilibhit.

Lieutenant-Colonel J. A. Cunningham to be Civil Surgeon, Umballa.

Leave.

Major Melville, furlough for 1 year.

Captain V. G. N. Stokes, combined leave for 1 year.

Retirements.

Honorary Captain C. Gill, I.S.M.D.

R.A.M.C.

Lieutenant-Colonel A. E. Morris to Command Station Hospital, Jubbulpur; Major F. R. Buswell, to that of Jubbulpur; Captain F. Kiddle to that of Abu; Captain A. R. O'Flaherty to that of Sangor; and Captain D. O. Hyde to that of Khandalla; Lieutenant-Colonel H. A. Haines officiates in command, Station Hospital, Umballa; Lieutenant-Colonel T. P. Woodhouse officiates as P.M.O., Lahore division.

"Medizinische Blätter," No. 10, 1906.

ANKYLOSTOMES AN ETIOLOGICAL FACTOR IN MALARIA.

Schwald, of Brazil, states that he finds in persons suffering from malaria and infected by *Ankylostomum duodenale* that these worms contain the malarial parasite in their intestine and in the mucous glands of the ankylostome's mouth. Schwald is of opinion that these parasites may directly reinfect man, and may transmit malaria by means of eggs or larvae. It is necessary in such cases to cause the expulsion of the worms before treating the anæmia present in all patients thus afflicted.

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Annual Report of Government Veterinary Bacteriologist," Pretoria, 1906, p. 110.

"BLUETONGUE" IN SHEEP.

Theiler, A. The disease may be met with throughout the Transvaal in marshy localities and along the river banks, and is especially rife in the autumn, i.e., in the rainy season, and it is very probable that, like "horse sickness," it may be conveyed by a nocturnal biting insect. As the blood of the sheep that have suffered from the malady ceases to be virulent after recovery, it may be supposed that during the dry season the virus is preserved either in the intermediate host, or in the body of some vertebrate other than the sheep, possibly aquatic.

The virus contained in the blood or serum, if well diluted with physiological water, passes through a Berkefeld filter. The dried blood dissolved in physiological water, and inoculated, produces, after the usual period of incubation, a characteristic febrile reaction, and it is possible that this may be made the basis of a plan of vaccination.

The immunity conferred by a single inoculation is, however, somewhat feeble, and further inoculations of increasing doses are usually followed by the symptoms of bluetongue and sometimes by death. Sometimes, however, immunity is acquired after a second inoculation of blood, as was also found by Spreull, and Theiler further confirms that observer's statement, that sheep which have passed through the disease, and have afterwards been injected with 500 cc. of virulent blood, yield a serum which possesses preventive properties, 5 to 10 cc. of such serum suffice to protect, but do not cause any obvious reaction.

"Bulletin de l'Académie de Médecine," Paris, Year lxx., Nos. 8, 9.

ANTI-DYSENTERIC SERUM.

Vaillard, L., and Dopter, C., immunised horses by inoculation on alternate weeks with progressive doses of living bacilli and of soluble toxin. The toxin is obtained by filtering through porcelain a culture of dysenteric bacillus in Martin bouillon kept for twenty days at a temperature of 37° C. of ninety-six patients treated by hypodermic injections, and later by injections into veins; all recovered except one. Of the patients thus treated, all had been subjected to the usual dysenteric remedies unsuccessfully. As soon as the serum treated was employed, the patients' condition altered for the better, and recovery was established in from two to six days, according to severity of illness. No untoward symptoms are reported from the serum treated. The minimum dose employed was 20 cc. hypodermically given and repeated once or twice in the severer cases.

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- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
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- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

Original Communication.

HUMAN SPIRILLOSIS IN LOANDA
(ANGOLA).

By A. DE S. MAIA LEITAO, M.D. (Oporto).

Captain Portuguese Colonial Medical Service; formerly at
London School of Tropical Medicine.

(PRELIMINARY NOTE.)

(Translated by the author from the note sent to the "Archivos
de Hygiene e Pathologia Exoticas," of Lisbon.)

On July 24th, 1906, on examining the blood of a black soldier, native of Golungo, aged 24, who has been in service in Loanda some time, I found spirilla like those of Obermeieri [1].

The blood of the patient was examined by the writer at the request of Clinical Assistant Dr. G. Vicira, of the "Hospital Maria Pia," of Loanda, who suspected trypanosomiasis.

The blood films were stained by Leishman's stain, and examined by the $\frac{1}{2}$ oil immersion lens, when they showed the spirilla referred to.

It is the first time, to my knowledge, that this disease has been found in Loanda, and I therefore hasten to communicate the fact, although I have deferred making it public for some time, hoping to find other cases of the disease and also to find the tick [2] — *Ornithodoros moubata* — which is reported to be present in Loanda, but I have failed to find it up to the present.

I am also looking for the enemy of this tick—the *reduviidus* of F. C. Wellman, M.D., which was classified by E. E. Austen as *Phonergates bicoloripes*, Stål [3].

When the patient entered the hospital he was in the last stages of the disease, so that only the first blood examination was positive, and owing to the subsequent examinations being negative I could not make inoculations of animals.

Later the embryos of *Filaria perstans* were found in the blood of the same patient. As soon as further opportunity affords I will endeavour to ascertain whether this spirillum is *Spirillum Obermeieri* or *S. Duttoni*, or whether it differs in any way from these two. For this purpose I shall adopt pretty closely the views of Frederick G. Novy and R. E. Knapp [4].

REFERENCES.

[1] I have sent blood films to the London and Lisbon Schools of Tropical Medicine to be verified.

[2] The Portuguese name is "Carrapato" not "Garapato," as Sir Patrick Manson has it in his "Tropical Diseases," p. 714, 3rd edition, 1903.

[3] *Journal of Tropical Medicine*, 1906, p. 113.

[4] Studies on *Spirillum Obermeieri* and related organisms analysed in *Bulletin de l'Institut Pasteur de Paris*, 1906, p. 612, t. ix.

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THE

Journal of Tropical Medicine

DECEMBER 1, 1906.

THE AFRICAN POISON TEST.

DR. F. C. WELLMAN, in an article published under the *imprimata* of the American Society of Tropical Medicine, gives an interesting account of the African poison test as observed in the Portuguese colony of Angola, West Africa. The test by poison is employed as a means of settling disputes in many parts of Africa, and from time to time we have accounts which give so varied statements of the method, ritual, and drugs employed that many untravelled people regard the reports as mere travellers' tales.

Dr. Wellman's account is taken from observations amongst the Umbundu-speaking Bantus in the province of Angola, and he describes the poison test as it is practised amongst these people. Ombulungu is the local name for the ordeal, which, however, has different names in different parts of Africa.

The custom of administering justice by the poison test is of ancient origin, but has come down to the present day with an accumulation of ritual and ceremonial which tend to obscure the rational and elevate the mythical phase of the proceeding. The poison test is appealed to on occasions of disputes of several kinds, and withal so frequently that, according to Dr. Wellman, it is "a custom which has nearly depopulated whole districts, and has been responsible

for more deaths in Africa than have many important diseases."

The disputes which occasion resort to the poison test are: Hereditary disputes—family or clan feuds in fact; cases of murder when there is doubt as to the culprit; cases of adultery, and cases of alleged killing by witchcraft. In addition to these causes of quarrel, acts of thieving, be it of stolen property, slaves, wives, or cattle, after settlement by divination in presence of a witch doctor is impossible, the aggrieved party challenges his antagonist to trial by poison. To refuse the challenge is equivalent to a confession of guilt. When the quarrel reaches this point a witch doctor acceptable to both parties in the quarrel is decided upon, and with him lies the duty of preparing the poison. To the witch doctor each party to the quarrel, accompanied by friends and relatives, proceeds, and after preliminary speeches by the combatants, in which each loudly asserts his innocence, the poison is given them to drink. After drinking, a native dance takes place, and whichever man first falls down is held to be the guilty party. His friends then carry him away to die or recover, according to the strength of the poison given him.

There seems a certain rude justice in this account of the poison test, but when we come to look below the surface we find that, the witch doctor not being above bribery, it is usually the litigant with the longest purse that wins. "Refreshers" in the form of presents serve to bribe the judge, and to warp his mind so that his decision is settled beforehand, and the method and manner of administering the poison draught is tampered with accordingly.

Dr. Wellman points out some of the tricks by which the witch doctor adjusts the draught in accordance with his preconceived conclusions as to which of the litigants is to die. One plan is to fill two drinking vessels (*gourds*) with apparently similar ingredients, one for each of the disputants; but although to all appearances identical, one of the vessels, that intended for the unfortunate man whom it is meant to condemn, contains a potent poison. Another plan is, however, more subtle; one *gourd* only is used, the favoured individual is given the first half of the draught to drink, his opponent the latter half. After the former has finished his draught, however, the contents of the vessel are stirred, whereby the actual poison, which hitherto lay at the bottom, is mixed with the fluid, when the second man receives the full benefit of the lethal substance. Several other methods of trickery are practised by the witch doctor, such as enclosing the poison in a resinous substance placed at the bottom of the vessel, which can be liberated when desired by scratching the resinous enclosure with the nail of the finger when stirring the decoction. Instead of this, a skin bag with two compartments, one containing a poisonous, the other an innocuous, powder of similar colour is employed, and the contents of either bag dusted in the fluid into the *gourd* as desired.

Dr. Wellman gives the plants from which the substances used in the poison test are obtained in various parts of Africa with his customary accuracy of detail. Of these he mentioned *Strychnos icaja* (Baill.); *Physostigma venosum* (Balf.); *Erythrophloeum judicale*

(Proct.); *Tanghinia venenifera* (Poir.); *Allenium somalense* (Poir.); and *Menabea venenata* (Baill.).

Amongst the Umbundus, however, none of the above were used, but instead *Erythrophloeum* (*E. guineense*) (Don.), with two other poisonous plants, namely, *Securidaca longipedunculata* (Fres.) — the Utica bush, and more rarely *Tephrosia vogelii* (Hook, fil.).

The effect of the mixture used in the poison test by the Umbundus is, in the first onset of symptoms, vomiting and purging. This is followed later by loss of power in the limbs, and the victim falls to the ground and dies speedily and quietly. The administration of the test occasionally fails owing to the witch doctor's inefficient steps in mixing or disguising the poison, when both disputants may die from the effects of the draught.

THE ORGANISATION OF THE MEDICAL SERVICE OF THE NATIVE ARMY OF INDIA.

THE organisation of the military section of Indian Medical Service has during the last few weeks formed the subject of two leading articles in an influential Indian contemporary, the *Pioneer*, and as that journal usually keeps itself well in touch with the official hierarchy of Simla, it may be taken as tolerably certain that the subject would not receive such marked attention in its columns unless changes of organisation were under consideration.

The present system, it may be admitted, is somewhat archaic, being simply the old and somewhat discredited "regimental system," but it by no means follows that it is therefore unsuited to the Indian Army, as it must be remembered that Indian civilisation is also very archaic, and although the sepoy is armed and drilled on the most approved modern European models, he remains in his social and domestic life a very archaic person. Soldiers' institutes and sergeants' messes, athletic clubs, and so forth, have, for example, become absolute necessities of life for the British soldier, but they would be impossible and useless in the native army; and the same differences of habits that make our European organisation of the social side of military life unsuited to native troops, deprives the station hospital system of most of its advantages when applied to them. Perhaps the most striking advantage that can be claimed for the station hospital system is the greater efficiency and economy of dieting arrangements, but owing to caste prejudices nothing of the kind can be attempted on behalf of the native, as some castes are so exclusive as to object to take food even if prepared by a Brahman of the highest standing. It is extremely difficult to convey to the uninitiated the difficulties that meet the European physician at every point of the dieting and nursing of native patients, and as our native regiments are almost universally recruited from men of the best and most exclusive castes, a vast amount of tact and an intimate knowledge of caste custom are essential to the medical officer of a native corps to enable him to exercise his profession with success. Moreover, the subdivisions of caste are so

intricate, and the tendency to fission within the caste is so strong, that it by no means follows that one can prudently act in the case of the 100th Dogras in the same way as one might in the 101st of the same caste. The redeeming point of the old regimental system in the British service was the personal knowledge of his patients acquired by the regimental medical officer, a most valuable asset to any physician, but the importance of such knowledge for him is but trivial as compared with its indispensable character in the case of native troops.

The weakness of the regimental system lies, of course, in its inapplicability to modern conditions of active service.

The *Pioneer*, it must be remembered, unlike our European lay journals, appeals mainly to an official public, and to a great extent may be said to be written by experts for experts, and it may be well, therefore, to consider seriously the line of argument taken by it, and the proposals it has to make for improvement.

It takes as its text an excellent remark of Colonel P. S. Maitland, in a paper on Army Re-organisation, read before the United Service Institution of India in 1890, which runs as follows:—

"There is one condition that is universally recognised in the organisation of the army of every State which has any pretensions to rank as a military Power, and also in some which have no pretensions at all. It is, I think, not too much to say that this condition exists in every army whose efficiency is of vital importance to its country, and it may therefore be regarded as an essential factor in producing that efficiency. This condition is that the war organisation of an army is precisely the same as the peace organisation. What I mean to say is that the army corps, divisions, brigades of an army with their staffs, trains and subsidiary organisations, exist in peace as they do in the field."

Judged by this indisputable test, it is at once seen that the station hospital plan stands under even deeper condemnation than the regimental system, for while the latter serves very well for short operations in which only small numbers of troops are employed, such as the counter raids on the frontier that are unfortunately so often unavoidable in India; the station hospital system has to be replaced on service by an elaborate system of field hospitals, in the working of which the officer has had no practice whatever during peace.

With the scathing condemnation of the station hospital system indulged in by our contemporary we have little sympathy, for while we equally regard the plan as a bad one in principle, we know that the skill and devotion of the officers of the R.A.M.C. have made it, practically speaking, extremely efficient for all that it is fit for—the necessities, to wit, of peace time. What we regard as its most striking defect is the lack of opportunities of exercising responsibility for the junior officer, as the latter is little more than a sort of superior clinical clerk to the senior medical officer, and so acquires practically no experience of the responsibilities of charge until, after long years, he has them thrown by seniority on his quite unaccustomed shoulders.

The regimental system, however, has this marked

advantage, that the habit and practice of responsible charge is thrown on the medical officer from almost the very outset of his service, and it is probably owing to this, more than to any other cause, that in spite of its admitted defects, our Indian medical military organisation has always "worried through" without an actual breakdown.

The *Pioneer*, therefore, proposes to retain the regimental system, but to institute an addition—a system of field and general hospitals, attached—which is most important—not to stations but to brigades. The regimental officer would attend to the sanitary necessities of his corps and provide for its military surgical arrangements as a unit in action, and would attend to the trivial cases in peace time, passing on the more serious cases to the field or general hospital just as he would in war, but the officers of the latter would form an integral part of the Brigade to which they belonged, and so would retain the personal touch with their patients, so essential in dealing with native troops.

It is obvious that when the regimental work in peace time was too light to occupy the entire time of an officer, his services might be utilised to some extent in the larger hospital by giving him a ward, for the medical treatment within which he should be solely responsible, and also that under such a plan all that would be required on a Brigade taking the field would be, as our contemporary remarks, not "alteration, but expansion," by the strengthening of the field hospitals by additions to their staffs, as it is obvious that on active service the regimental surgeon, forming as he would this first line of medical aid, could not be made in any way available for assistance in the second and third lines. Space forbids our entering into the details of the plan as outlined by our contemporary, but there is undoubtedly much to be said in its favour, and we therefore trust that the article referred to may really be taken as a shadow forecast by the events that are being worked towards by the responsible authorities.

It is obvious, however, that, like most changes tending to increase efficiency, the plan so ably advocated by the *Pioneer* involves a considerable increased expenditure. The regimental medical officer remains as such, and a considerable addition must be made to the nominal roll of the service, to afford at least the nucleus of a *personnel* for the field and general hospitals. The station hospital plan, on the other hand, though nasty, is cheap; cheaper even, perhaps, than the regimental system, though the latter is extremely inexpensive as worked in the native army, where practically one commissioned officer and two or three subordinates (hospital assistants and compounders) for each battalion, with a few odd men thrown in for staff and detachment work, form the entire *personnel*. This proportion of medical aid to fighting men is, of course, far smaller than that subsisting in the British Army under the station hospital plan, and it is extremely doubtful if even in the native army the latter could be worked with a smaller personnel than that now employed, under the regimental system.

It must be remembered that the Indian Medical Service enjoys an advantage possessed by no other military medical organisation in the shape of a reserve

of trained military surgeons much stronger in number than those actually employed with the troops.

This reserve is the Civil Branch. When war breaks out the civil surgeons hand over their duties to their native assistant surgeons, who are fully qualified practitioners, and at once proceed to the front, when in practice they officer the field and general hospitals, the regimental officers naturally and justly claiming the more attractive share of the work in accompanying the fighting line. Having all passed through a more or less prolonged period of military work and being habituated to constant and onerous administrative responsibility, they fall naturally and easily into their places, and the practical outcome of the present system is very much the same as the theoretically more ideal system advocated by the *Pioneer*.

During the Tirah Campaign, for example, something like a third of the civil surgeons in the United Provinces were withdrawn for service in the field. And really all that is wanted to secure smooth working is occasional mobilisation operations in time of peace; so that whenever manœuvres were conducted within their Province, the civil surgeons might occasionally enjoy the opportunity of mobilising their field hospitals, the materials of which might be stored at provincial capitals under the charge of the regimental officers stationed there. Failing, therefore, the funds to carry into effect the more ideal system advocated by the *Pioneer*, why not leave things alone?

EXPERIMENTS IN PRACTICAL CULICIDAL FUMIGATION.

ARTHUR I. KENDALL, Ph.D., of the Board of Health Laboratory, Panama, states that one of the most important sanitary problems associated with the digging of the Panama Canal is the suppression of mosquito-borne diseases. The destruction of mosquitoes is accomplished in several ways, but Mr. Kendall deals only with fumigation.

METHODS OF PROCEDURE.

(1) Preparation of the house: Disturb the apartments as little as possible; stop up all openings; have the door guarded by a canvas curtain.

(2) To fumigate: For each 1,000 cubic feet of air space, 2 lbs. of sulphur, or 2 lbs. to 4 lbs. pyrethrum, are placed in a pot and set alight.

(3) After a few hours the house is opened up, the mosquitoes swept up with a damp broom, the paper and paste used in stopping up cracks removed. Of the several fumigants, sulphur is the most convenient for use. Pyrethrum, also known under the names of "Bubach," Persian insect powder and Dalmatian powder, is used, but the powder should be that obtained from unexpanded flowers, and not the adulterated varieties frequently offered for sale.

Campho-phenique, called also Mimm's mixture, consists of a mixture of equal weights of camphor and (95 per cent.) carbolic acid, and has proved a fairly reliable culicide. Four ounces of the mixture is placed

on shallow pans for each 1,000 cubic feet of air space, and subjected to the heat of an alcohol lamp.

Of the three fumigants mentioned, campho-phenique has the advantage of being cheap, efficient and non-objectionable. Sulphur is efficient but proves injurious to fittings and fabrics. Pyrethrum is unreliable and causes darkening of light-coloured paint and similar substances.

Several other fumigants have been experimented with. Concerning these it is stated: Hydrocyanic acid is dangerous to human beings, owing to its poisonous fumes; chlorine gas has the disadvantage of bleaching fabrics; carbon disulphide is dangerous owing to its inflammability; Jimson weed or stramonium is unreliable; formaldehyde is an unsatisfactory insecticide, although so potent a bactericide.

JUVENILE SMOKING.

It is said that we are without information as to the effects of smoking upon native children in warm climates. Our correspondents might help the enquiry now being conducted by a Select Committee of the House of Lords, which is at present engaged upon the Juvenile Smoking Bill, by giving their opinions. We do not ask for scientific proofs concerning the effects of smoking on native children, that is well-nigh impossible, but although definite proofs may be wanting, observations on the subject may be of value.

The points we suggest for enquiry and reply are:—

- (1) Do the children of natives in warm climates commence to smoke at a very early age, and, if so, state approximately at what age?
- (2) Are deleterious effects observable?
- (3) What is the form in which tobacco is used?
- (4) Do parents in the Tropics discourage the use of tobacco by their children?
- (5) Are parents of opinion that juvenile smoking is deleterious, if so, in what way?
- (6) Is tobacco supposed to have any beneficial action in the prevention of disease?

Answers to these questions, forwarded to the Editors, will be submitted to the Select Committee of the House of Lords.

PRECISE DEFINITION OF DISEASES.

DR. JAMES F. LEYS, Surgeon United States Navy, in an article which appeared in the *Medical Record* of June 10th, 1906, draws attention to the nature of the definitions customary in medical text-books. He objects, and rightly, too, to the use of *a* or *an* in defining specific diseases, and cites as an example a so-called definition of anthrax commencing, "Anthrax is *an* acute," &c. Leys would employ the following formula for a disease of which the cause is known: Anthrax is "*the* disease caused by an invasion of *Bacillus anthracis*." In the same way actinomycosis is *the* disease caused by an invasion of *Actinomyces bovis*. Similarly may be defined tuberculosis, diph-

theria, malaria, and so on through all the diseases the cause of which is known. It is to be hoped Dr. Ley's advice will be taken, and so-called definitions, which are more in the nature of short descriptions, at present in use be dropped.

ANTI-MALARIAL CAMPAIGN IN AUSTRIA AND HUNGARY.

THE Austrian Government has during the past two years been conducting an anti-malarial campaign along the Adriatic coast with marked success. It is from this region that the majority of sailors for the fleet are recruited, and the prevalence of malaria amongst the inhabitants of the coast has proved a serious detriment to the health of the navy. The means taken to eradicate the disease is by draining swampy grounds, oiling collections of water, and the distribution of quinine. The success of these measures has been proved by the fact that during the past two years the number of fresh cases of malaria declined 62 per cent. The Governor of Dalmatia has instituted similar prophylactic measures in his province with encouraging success. In Hungary, the part played by the mosquito in the spread of malaria is being taught, and in many districts stringent measures are being prosecuted to exterminate the Anopheles.

Reports.

MEDICAL OFFICERS OF MISSIONARY SOCIETIES' ASSOCIATION.

At meetings of this Society held in May and October, Mr. McAdam Eccles introduced the subject of "The Surgical Aspect of the Missionary Candidate"; he dealt with the various systems *seriatim*, the following being an epitome:—

RESPIRATORY SYSTEM.

Allusions were made to deflected septum of the nose and to nasal polypi, and to *adenoids* and their consequences. He said that many a missionary candidate had poor physique owing to the results of adenoids, and to a town life, particularly when their occupation had been that of clerk or shop-woman. It was important to see that there was no defect of the larynx, as a clear voice was of much importance in the preacher.

ALIMENTARY SYSTEM.

With regard to the question of teeth, the first fact of importance was whether the loss of a certain number of teeth negated the going abroad of the candidate. Mr. Eccles thought not, but that the question of how the teeth met, in other words, their usefulness, was the real issue. Artificial teeth were essential for those who had lost a number of teeth, but they must be good, simple, worn for some time

previous to leaving England, and two sets should be taken out.

Should a *hernia* disqualify? Mr. Eccles answered this in the positive. A radical operation should be performed at least six months before going out. Femoral herniæ, and particularly those in men, were more dangerous than inguinal, and possibly umbilical even more than femoral.

What should be the course adopted with regard to *appendicitis*? He was emphatic that if there has been one attack of a definite nature, operation was imperative before the candidate could be allowed to proceed abroad.

VASCULAR SYSTEM.

Varicose veins, should they be always a bar to service? No, it depends upon the variety of varicosity. There are really three forms of varicose veins, one the single enlarged vein, due probably to a congenital defect, and one easily cured by operation; the second, the congestive form, in which there are a number of small superficial veins enlarged, these give rise to much trouble and are difficult to cure by operation, and probably it is best to reject the candidate who is the possessor of them; the third form, due to obstruction by pressure within the abdomen, means, as a rule, that there is trouble which necessitates rejection, unless the pressure can be satisfactorily removed, and that permanently.

Varicocele.—Here, again, each case has to be taken on its merits. Slight enlargement of the spermatic veins, especially if there have been no symptoms arising therefrom, need not be dealt with surgically, and it is important not to draw the candidate's attention to them, if he does not complain of them. On the other hand, if there has been trouble from these varicose veins, it may be that this very fact is an indication that the person is not a suitable one to stand the wear and tear of a life in tropical climes.

Hæmorrhoids.—These should always be operated upon, on account of the increased liability to constipation on foreign service. Also returned missionaries who have been subject to hæmorrhoids should be strongly advised to have them treated surgically.

LYMPHATIC SYSTEM.

Enlarged Glands.—These often mean that the candidate has had poor physique, and scars in the neck should always mean a careful examination. It has been suggested that tuberculous glands in early life tend to render the person immune to tubercle in later years; this may be so, but there is often an inherent weakness in persons who have been the subject of tuberculous glands.

Enlarged Thyroid Gland.—This is not necessarily a bar to work in the foreign field, but great care should be taken to exclude the candidate should the enlargement be the indication of early exophthalmic goitre.

LOCOMOTORY SYSTEM.

There are a large number of conditions of the feet which, although apparently small in themselves, are of great importance from the point of view of the missionary candidate.

Flat-foot.—Any tendency to flat feet, particularly in women, should be looked upon with suspicion, often indicating general want of tone.

"In-growing Toe-nail."—It is well to bear in mind that this condition is very common, and that it is not due to the "in-growing" of the nail, but to the overpushing of the soft parts. The treatment of the lesion is not to remove the great-toe-nail, but to push back the soft parts, and to see that a proper boot is worn.

Hammer-Toe.—This condition may cause most troublesome lameness, and should be treated surgically before a candidate is accepted.

Hallux Valgus.—The same applies to this deformity.

Diseases of Joints.—There are several lesions of joints which naturally interfere with locomotion, and may be of hindrance to the missionary. They may necessitate the refusal of the candidate. Loose bodies and loose cartilages should be treated by operation before the possessor proceeds abroad.

Paralysis, including Infantile Paralysis.—It is probably best to refuse a candidate who is the subject of paralysis of any kind.

Deformities.—Any marked deformity is a contra-indication to acceptance.

SPECIAL SENSES.

Eyes.—The importance of eye symptoms cannot be over-rated. Headaches, mental strain, and other conditions are often due to eye lesions, and any tendency to these should lead to a careful examination of the eyes. If it is necessary for spectacles to be worn, they should be fitted and tested some months before the missionary goes abroad, and a spare duplicate instrument should always be taken out.

Ears.—Otitis media, if present, should always disqualify, and any great degree of deafness would also do the same.

Discussion was adjourned till the Association's meeting on October 30th, when, amongst others, the following members took part: Colonel Hendley, I.M.S., Mrs. Scharlieb, M.D., Drs. MacDonald, Harford, Soltan, Fox, and Price. Discussion centred chiefly round the questions whether with an indefinite history of an attack of appendicitis an operation should be performed? Whether the operation, having been successful, the individual was by the nature of the disease predisposed to enteric infection? Cases being quoted to support such an hypothesis.

The question of enlarged glands, which had suppured earlier in life, leaving behind merely scars, proved also of interest, particularly with regard to the problem whether in such cases there was immunity from tubercle conferred, or whether such individual under the stress and strain of life abroad showed an increased incidence of tuberculous disease.

The condition of movable kidney in the candidate was also brought forward.

THE SOUTH AFRICAN MEDICAL CONGRESS.

On October 1st, 1906, the South African Medical Congress was opened at Bloemfontein, Orange River Colony. Some seventy medical men from widely

separated parts of South Africa were present. The Hon. F. Wilson, C.M.G., acting Lieutenant Governor of the Orange River Colony, opened the Congress, and in the course of his speech dealt with the various laws affecting medical men and the public health. The President of the Congress, A. E. W. Ramsbottom, M.D., of Bloemfontein, in his opening address, strongly advocated unity amongst medical men in South Africa.

The President of the Section of Medicine, H. Aylmer Dumat, M.D. Edin., F.R.C.P. Edin., delivered an address entitled, "The Motive Powers of the Mind." G. Porter Mathew, M.D., opened the discussion on "The Treatment of Uterine Displacements." Drs. Klots, Murray, Mackenzie, Davies, Ashe, Gordon, Grant, and Knobel took part in the discussion.

G. Ritchie Thomson, M.B., C.M. Edin., F.R.S. Edin., read a paper entitled, "The Diagnosis and Treatment of Diseases of the Biliary Passages." Drs. Ashe, Davies, Knobel, Murray, and Richardson discussed the paper.

G. E. Murray, M.B., F.R.C.S., read a paper on "Fistulous Communications with the Urinary Tract."

J. B. Knobel, M.D., L.R.C.S. Edin., contributed a paper on "A Case of Obstinate Ulceration of the Dorsum of the Fingers and Dorsum of the Left Hand, probably due to Unilateral Raynaud's Disease."

His Excellency the Acting Governor of the Orange River Colony attended the Public Health Section of the Congress, and took part in the work of the Section.

Miscellaneous.

PIETRO JAMES MICHELLI, C.M.G.

(Secretary Seamen's Hospital, and London School of Tropical Medicine.)

THE authorities of the London School of Tropical Medicine are well aware of their indebtedness to Mr. Michelli, upon whom His Majesty King Edward VII. recently bestowed the most honourable distinction of Companion of St. Michael and St. George. It may be safely said that the honour has never been bestowed upon one more worthy of the distinction. The London School of Tropical Medicine has been built up, launched, floated, and started upon its useful and successful mission under Mr. Michelli's capable and efficient pilotage; and it is to be hoped he may continue for many years to shape its course and stand by its helm.

It was to Mr. Michelli that Sir Patrick Manson, in 1897, first unfolded his scheme for imparting instruction in tropical medicine, and from that date until the present moment Mr. Michelli has taken a lively and enthusiastic interest in all that appertained to the success of the School.

The scheme once formulated was submitted to the Board of Management of the Seamen's Hospital Society. The members of the Board grasped the national importance of the proposal. The then Deputy

Chairman (now the Chairman of the Board), Mr. Perceval A. Nairne, entered heartily into the development of a school of the kind, and, loyally assisted by his colleagues, they resolved to finance the effort and aid the foundation of a School of Tropical Medicine at the Branch Hospital of the Seamen's Hospital Society, Albert Docks, London, E. The formation of a school for the study of tropical diseases was a peculiarly appropriate step for the Board of Management of this Hospital to take, for the patients in their wards were largely composed of sailors suffering from tropical ailments. Here was the material for study, and it only needed someone to initiate the idea, and to organise and finance the scheme to bring it to a practical issue.

The Colonial Office, under the stimulating lead of the Right Hon. Joseph Chamberlain, M.P. (at that time the Secretary of State for the Colonies), lent willing assistance, and contributed a sum of £3,550 towards the scheme.

Since then many liberal contributors have furthered the requirements of the School, and several of the Crown Colonies have contributed towards its maintenance and development.

Some £40,000 have been spent upon the School, yet it is satisfactory to know that the School is free of debt, and likely to continue so. In all the work of organisation Mr. Michelli has played an active and a prominent part, and we rejoice to think that his devoted services have been rewarded in a manner which reflects honour upon himself, and has given pleasure and satisfaction to all the members of the Board of the Seamen's Hospital Society, and to the staff of teachers at the London School of Tropical Medicine. We believe Mr. Michelli is the first secretary to a public hospital on whom an honour of the kind has been bestowed, and we take it that amongst the many able men who serve their hospitals in a like capacity, the decoration of Mr. Michelli will be regarded as a welcome recognition of how their efforts are regarded, not only by the King, but by the country generally.

Reviews.

ILLUSTRATED KEY TO THE CESTODE PARASITES OF MAN. By C. H. Wardell Stiles. Washington, 1906, pp. 104.

THIS small volume (Bulletin No. 25), issued by the Hygienic Laboratory of the Treasury Department, U.S.A., is an elaborate and carefully executed companion to the "Illustrated Key to the Trematode Parasites of Man" (Bulletin No. 17), issued by the same laboratory. Both these volumes deserve a better setting than has been given them. In their present form, however, they are eminently useful; the illustrations, mostly in diagrammatic form, are excellent for teaching purposes, and the text will be found to be practical and easily followed.

Correspondence.

INTERNATIONAL CONGRESS FOR HYGIENE AND DEMOGRAPHY.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

DEAR SIRS,—I shall be very much obliged to you if you would have the kindness to publish the following notice in your Journal.

Berlin,

November 14th, 1906.

Yours faithfully,

DR. NEITNER,
Secretary-General.

THE FOURTEENTH INTERNATIONAL CONGRESS FOR HYGIENE AND DEMOGRAPHY.

Her Majesty the Empress of Germany has most graciously accorded her high protectorship to the work of the Fourteenth International Congress for Hygiene and Demography, which will take place in Berlin in September of next year.

TYPHUS AND SPOTTED FEVER.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—I see on p. 271 of your issue of September 1st, that the Mexican Government have offered three prizes of £4,000 each for discoveries connected with typhus, and that Dr. Terres, of Mexico, states that typhus is seldom met with below an altitude of about 2,000 feet. Is not this disease more probably the "Spotted Fever" of the Rocky Mountains? This fever has been known, since 1872, in some of the four neighbouring States of Nevada, Montana, Idaho, and Wyoming. It is often confused with typhus, because of the eruption which usually appears first on the wrists, ankles, and back, about the third day, and spreads rapidly over the rest of the body, lasting from eight to twenty-one days, or even longer; the spots are petechial, and sometimes coalesce, giving a mottled appearance to the skin. Among other symptoms resembling typhus there are injected conjunctivæ, photophobia, epistaxis, offensive breath, sordes on teeth, dry, brown tongue, and weak pulse. Hypostatic pneumonia is the most common complication; convalescence is slow, and there are many other minor resemblances to typhus. The American doctors who have studied the disease, and have taught us the little we know on the subject, are not usually very well acquainted with typhus, but they consider that the two diseases are distinct. Among symptoms which do not resemble typhus we hear of desquamation, jaundice, tenderness of the right iliac fossa, tympanitis, swollen joints, vomiting, enlarged liver and spleen. Mr. C. W. Stiles made a zoological investigation into the etiology of "Spotted Fever," in 1904, for the United States Government, and was unable to confirm the theories that the blood contained a piroplasma, or that it could be communicated by ticks to rabbits or other animals. His communication was published last year by the Hygienic Laboratory at Washington.

Cavendish Square,
London.

Yours truly,

F. M. SANDWICH, M.D.

Drugs and Remedies.

THE "TABLOID" BRAND.—We congratulate Messrs. Burroughs Wellcome and Co. on their successful defence of what would appear to have been an infringement of their rights to the exclusive use of

their designation for compressed drugs. A trading company wished to register the word "Tablones," to designate their products. This was refused by the Board of Trade and subsequently on appeal to the High Court of Justice. The several attempts to dethrone the magic word "Tabloid" has hitherto ended in deserved failure. There can be no doubt that words resembling "Tabloid," used by companies other than Burroughs Wellcome and Co., are only employed for one purpose. Surely we have enough originality left amongst us to devise catching names for new preparations, without seeking to come in conflict with existing terms.

The three following preparations are issued by Messrs. Martindale, 10, New Cavendish Street, London, W.:

TYLMARIN, a new coumaric derivative. It has been commended for the treatment of tubercular glands, in conjunction with injection of the 22 per cent. solution of sodium-orthocoumarate and the glycerine solution of sodium cinnamate. The same drug is suggested as a treatment in malignant ailments.

SYRUPUS IODO-TANNICUS, is a palatable preparation containing iodide in loose chemical combination, and employed in the treatment of enlarged cervical glands.

SEDEFF contains suitable doses of opium, bismuth, and digestive ferments; it is useful in digestive derangements, especially those accompanied by vomiting, and in the sickness of pregnancy.

Books and Papers Received.

PROFESSOR GALLIO-VALENIO's new work on the Mosquito is published by Edwin Frankfurth, 12, Grand Chene, Lausanne, Switzerland. The book is illustrated. Price 4.50 francs.

Notes and News.

LEPER COLONY IN THE PHILIPPINES.—A permanent leper colony has been established at Colion Island, in the Philippines. Some 200 lepers are now installed there. Four Roman Catholic Sisters have volunteered to nurse the lepers in the colony.

THE King of the Belgians has offered a prize of about £7,000 to any person, of any nationality, who shall discover a cure for sleeping sickness. A sum of about £10,000 is also offered by His Majesty for the purpose of making researches and experiments towards exterminating sleeping sickness.

R. KOCH is at present in Sese, Bugala, in Africa. The investigation of sleeping sickness is usurping the whole of his time.

ISTHMIAN CANAL COMMISSION.—From January 1st to August 31st, 1906, only one case of yellow fever was reported from the Canal Zone. During August, 1906, the mortality from the most prevalent diseases was as follows: Pneumonia, 94 deaths; malaria, 78; typhoid fever, 12; dysentery, 20; beri-beri, 5. The population of the part of the Isthmus from which these figures are obtained, numbers 75,000 people.

During September, 1906, pneumonia caused 86 deaths, and malaria 70. During the months of August and September, 1906, there were no fatal illnesses amongst the 4,800 Americans (whites) in the Canal Zone.

ACCORDING to our last news from India, the students of the Campbell (vernacular) Medical School of Calcutta had been out "on strike" for a week. According to the version of the affair as reported in the *Pioneer*, the cause of dissatisfaction in this particular case appears to be of a frivolous and personal character; but as the vernacular medical students have always shown themselves in the past as a very well-behaved set of young men, it may be taken that these recurring evidences of friction and discontent in these widely distant schools, are merely symptoms of a general feeling of dissatisfaction with the conditions prevailing in the service. It is to be hoped that the probably ill-advised turbulence of these boys will not prejudice Government against granting reasonable concessions in the matter of pay and prospects to this large and important service.

THE Punjab Government has before it a "Tenancy Bill," which includes some proposed enactments of medical interest. Clause 28 gives power to levy a tax to defray expenses connected with the sanitation and general administration of village sites. This should prove a very useful power, as apart from the theoretical position of the Government as the ultimate possessor of the soil, it deals directly as landlord to tenant in the case of the very extensive population of farm colonists, now settled on, till recently, waste lands, that have been reclaimed by irrigation.

Naturally enough, these chance collections of cultivators lack the power of cohesion and initiative of older villages, and the Government is in a far better position to make them models not only of cultivation, but of sanitation.

These newly irrigated lands are, as might be expected, extremely malarious, and for other reasons require special measures of sanitation.

An old village site can always be easily recognised by its elevation above the endless surrounding plains.

The Indian peasant is a bad hand at repairs, and often lets his mud-built homestead fall down when a little timely personal exertion might have kept it habitable for years to come.

The sun-dried bricks, of which the huts are built, are fabulously cheap, and cannot generally be so conveniently made on the site as on the banks of the nearest tank, so he does not clear away the site or utilise the old material, but roughly levels the heap and builds on the ruins, with the result, that in the course of the hundreds, and perhaps occasionally thousands of years, a site has been occupied, the

centre of it stands perhaps 50 or 60 feet above the general level of the ground. This elevation of the site is, of course, a valuable sanitary asset, but has the undesirable corollary of the environs of the site being honeycombed with irregular excavations holding dirty water throughout the greater part of the year. In the case of really old sites, the entire inhabited site is more or less surrounded and intersected with a miniature "lake district," the intricacies of which would puzzle an expert marine surveyor. The water they contain is for the most part indescribably foul, and one of the most urgent and insoluble of the problems of Indian sanitation is that of the betterment of the state of things that has resulted from the method of development of village sites above described.

Now the irrigation colonies just mentioned have only been started during the last few years, and it is most important that the Government, in its strong position as direct landlord, should step in and regulate the development of these new villages before the evils that have been touched upon have crystallised into established facts.

It is extremely desirable that the inhabited site should be raised well above the general level of the irrigated fields, and it is also most important that the subsoil beneath it should be drained. Now both these objects can be attained by making deep and properly graded cuttings to the nearest practicable outfall, and utilising the spoil to raise the site, but such operations can only be undertaken by the Government itself, and the power to levy a small tax to cover the interest of the capital outlay will be a valuable one, which we trust Government will promptly utilise, and justify by works of sufficient magnitude to demonstrate that irrigation is not necessarily incompatible with a good standard of public health.

THERE is a want of uniformity in the attitude of the various provincial governments in India in the matter of dealing with the growing evil of the cocaine habit. No steps, for example, have been taken in the United Provinces of Agra and Oudh, to bring cocaine under the provisions of the Excise Acts, and the result is, it appears, that these provinces form centres from which smuggling can easily be conducted into neighbouring provinces where the authorities have acted more wisely in the matter.

THE current (November) number of the *Indian Medical Gazette* includes two useful "Notes" by members of the Calcutta Plague Staff.

In the first Captain V. B. Nesfield, I.M.S., strongly advocates the use of chlorinated lime as a disinfectant. He points out that owing to lack of penetrative and diffusive power, the metallic germicides, such as mercuric perchloride, cupric sulphate, &c., though extremely powerful when they can be brought into actual contact with bacteria, fail in practice on account of the impossibility of securing contact. A drop of a cultivation, for example, of *B. coli*, placed on a scrap of paper, and floated on some such disinfectant, remains quite unaffected for a long time. The chlorine gas, however, given off by chlorinated lime diffuses itself into

chinks and crannies, and even permeates porous materials. The main objection to the agent is the difficulty of keeping it in good condition in a hot climate, and he therefore recommends that it should be sealed in glass tubes containing $2\frac{1}{2}$ oz. each, at a cost of $2\frac{1}{2}$ d. each. Each of these tubes suffices to make eighty gallons of a germicide lotion.

Chlorine is, of course, an excellent insecticide, but we doubt if it would be given off in sufficient quantity from such a lotion in a sufficiently concentrated form, to secure the destruction of flies; as if it were so, its application would obviously be dangerous to the disinfecting gangs; and failing the power to destroy insects no germicide can be considered reliable in dealing with plague.

Chlorine can, however, be easily and cheaply manufactured, with a suitable apparatus, by pouring slightly diluted sulphuric acid on a mixture of common salt and binoxide of manganese, the whole of the chlorine contained in the salt being liberated.

There would be no difficulty whatever in contriving a suitable apparatus to contain a charge of the salt and dioxide, into which an appropriate charge of acid might be tipped by pressing a button. All openings but one having been closed in the room to be disinfected, all that would be necessary would be to place the apparatus within the room, press the button, and immediately leave the room, closing the door behind one, as if provided with a fairly long flexible tube, the gas would not begin to issue from it until ample time had been given to effect the small manipulation necessary.

The second note, from the pen of Dr. W. C. Hossack, deals with the species of rats found in Calcutta. He finds that the rats concerned are *Nesokia bengalensis*, or Indian mole rat, 60 per cent.; *Mus decumanus*, the short-tailed grey rat, 26 per cent.; *M. alexandrinus*, a local race of *M. rattus*, the European long-tailed "black rat," 14 per cent.; and *N. nemovagus*, the lesser Bandicoot, which is rare.

If we remember rightly, Captain Glen Liston found the black rat relatively much commoner in Bombay, and, as he points out, that, owing to its habits, it is much more commonly concerned in carrying plague than the other species, its rarity in Calcutta may serve to explain the comparatively lightness of the incidence of plague in Calcutta from plague.

FEVER is becoming seriously prevalent in the frontier cantonments. A Peshawar correspondent writes: "The great topic of conversation at present is the tremendous prevalence of fever, and it seems likely that owing to it, the divisional manoeuvres, which were timed to take place about November 27th, will have to be abandoned, some 20 or 40 per cent. of the garrison being affected. The type seems to have reverted to the Peshawar fever of some fifteen years ago, which, happily, has been dormant for some years, and greatly resembles cholera."

A Rawal Pindi correspondent writes: "Pindi is still suffering under a veritable wave of fever of a most virulent type, and labour of any sort is scarcely procurable. Large fields of crops in the vicinity of the town stand uncut, long since over-ripe, bearing silent

witness to the melancholy fact of the prevailing sickness."—*Pioneer Mail*.

It may be taken for granted that no adequate anti-malarial measures have been attempted in either of these stations. WHY NOT?

Personal Notes.

INDIAN MEDICAL SERVICES.

Arrivals reported in London.—Lieutenant-Colonel J. Smyth, Lieutenant W. F. Brayne, Lieutenant C. H. Barber.

Extensions of Leave.—Major W. Pilgrim, furlough to February 3, 1907; Lieutenant-Colonel R. H. Castor, one week furlough; Major J. T. Calvert, study leave, January 15th to July 14th, 1906; Captain D. N. Anderson, 6 m. medical certificate.

Permitted to return to Duty.—Captain A. Murphy.

Postings.

Major H. E. Drake Brockman, Residency Surgeon, Western Rajput States.

Lieutenant-Colonel P. D. Pank, Residency Surgeon, Jaipur.

Lieutenant-Colonel W. H. B. Robinson, Agency Surgeon, Bikanir.

Major A. L. Duke, Residency Surgeon, Bangalore.

Major T. W. Irvine, Senior Surgeon and Sanitary Commissioner, Mysore.

Lieutenant J. F. Boyd, to Civil Medical Duties, Kohat.

Lieutenant B. E. M. Newland, to Civil Medical Duties, Chitral.

Lieutenant-Colonel A. W. Dawson, to Civil Medical Duties, Roorkee.

Civil Assistant-Surgeon Purna Chandra Mukerji, to Civil Medical charge, Gonda district.

Lieutenant-Colonel S. H. Henderson, to be Superintendent, Central Jail, Agra.

Colonel H. Hendley resumes charge as Civil Surgeon, Lahore, and Professor Midwifery and Forensic Medicine.

Major E. V. Hugo, to Civil Surgeon, Lyallpur.

Major G. F. W. Ewens, resumes charge as Superintendent Punjab Lunatic Asylum.

Major P. J. Lumsden, to be Agency Surgeon, Bhopawar.

Major N. Burden, to be Agency Surgeon, Gilgit.

Captain McCarrisa, to be Agency Surgeon, Alwar.

Major Scott Monterief, to be Agency Surgeon, Mewar.

Major J. Fisher, to be Agency Surgeon, Eastern Rajput States.

Lieutenant-Colonel A. M. Crofts, C.I.E., to be Administrative Medical Officer, N.W. Frontier Province.

Lieutenant-Colonel G. W. P. Dennys, to be Civil Surgeon, Peshawar.

Captain Fleming, to Consulate Medical Officer, Turbat-i-Haidari.

Captain L. J. M. Deas, to be Residency Surgeon, Gwalior.

Captain Macmillan, services at disposal Government Eastern Bengal.

Captain Munro, services at disposal Government Bengal.

The under-mentioned officers are permitted to continue in their appointments of specialists in prevention of disease: Major Julian, Peshawar; Major Taylor, Kamptee; Major Anderson, Meerut; Captain Spiller, Allahabad; Captain Smallman, Secunderabad; Captain Brunskill, Rangoon; Lieutenant Watson, Karachi.

The services of the following officers are placed at the disposal of the Government of India in the Home Department, with effect from October 16th, 1905:—

Lieutenant-Colonel R. N. Campbell, M.B.; Major D. R. Green, M.B., and Captains W. D. Hayward, S. Anderson, T. H. Delany, H. Inness, M.B., W. V. Coppinger, A. C. Gilchrist, and T. H. Watling.

Leave.

Major E. Jennings, 2 y. combined leave.

Captain H. Ainsworth, 7 m. combined leave.

R.A.M.C.

Lieutenant-Colonel T. B. Winter, to charge of Station Hospital, Bareilly; Captain W. Davis, to inspection of routes, in connection with Agra concentration; Major Mould, to Agra for duty; Captain J. F. Martin, from Northern Command to Poona Division; Lieutenant-Colonel G. Scott is granted six months' leave out of India.

COLONIAL MEDICAL SERVICE.

A. L. Hoops, M.D., D.Ph., State Surgeon and Superintendent of Prisons, Kedah, Malay Peninsula, has been appointed to act as Adviser to the State of Kedah during the absence on leave in Europe of Mr. G. C. Hart.

PECULIAR ERUPTIONS OF THE SKIN IN INDIA, DUE TO VEGETABLE AND INSECT LIFE, AND THEIR TREATMENT.

By Major G. H. FINK, I.M.S., M.R.C.S., L.S.A.Lond.

Most people who have lived in India will have seen from time to time curious forms of skin eruption due to certain vegetable and insect life. These are peculiar to certain provinces and districts in India. Bengal and Assam produce some which are not to be seen in any other part of the country, and these very often are powerful in their action and produce vesication of the skin, burn, and create discomfort which resembles that of a strong blister or a hot iron applied to the skin.

In parts of Assam, such as the North Lushai Hills, one well-known leaf which is cordate in shape, bluish-green in colour, of the size of the hand, which grows in the jungles, possesses this powerful property of a vesicant if touched.

But the effects of a certain spider lick or bite is to be seen frequently in children in Bengal, when the face is generally the part affected, owing to this part of the body coming frequently into contact with spider webs. The result is often an eruption on the lips or chin, resembling *Herpes*, which, if untreated, goes on to resemble *Impetigo contagiosa*, if you compare these eruptions with it.

Treatment.—The most effectual treatment of a spider's lick or bite is as follows:—

Take a basin of cold water and let the patient hold his or her head over it. Now get a few lumps of mustard oil cake (which is to be had in almost every oilman's shop, since the cake is obtained after expressed mustard oil is manufactured, and is used largely to fatten cattle), burn these in a charcoal fire till of a black colour. Drop the burning lumps into the basin of water, and allow the smoke and fumes which rise to come into contact with the part of the patient's skin which is affected, twice a day, for two or three days. The result is a perfect cure.

On examining the surface of the basin full of water, there will be seen a large number of transparent little droplets of a yellowish-white colour, and about the size of a pin's head, which look like so many eggs of lepidopterous insects, or like the simple follicles of the secreting organs of the spider tribe (*Arachnida*.)

The study of Spiders, Scorpions and the Acarida, as well as the parasitic Acarida (to which *Demodex folliculorum* belongs) is very necessary, and it would be therefore essential to devote attention to such

insect and parasitic life, as well as the Lepidoptera, which create skin eruptions of a vesicular and follicular type, and to their proper treatment in the early stages, otherwise the character of the affection is masked by the lapse of time, and its origin very often lost.

MOSQUITO BRIEF PREPARED BY THE AMERICAN MOSQUITO EXTERMINATION SOCIETY.

(1) THERE are over 100 species of mosquitoes in the United States.

(2) Mosquitoes breed only in water. They may breed in any kind of quiet water unstocked with destroying fish.

(3) Mosquitoes generally require from one to three weeks to develop from eggs to winged insects in warm weather, longer in cold weather. Some female mosquitoes three days old lay eggs, the average is greater. Some species lay as many as three or four hundred eggs at once, some lay them singly. Mosquitoes may live several months (as shown by hibernation and otherwise), but probably few live over a month.

(4) Mosquitoes do not breed in grass, but rank growths of weeds or grass may conceal small breeding puddles, and form a favourite harbouring place for adults. The pitcher plant holds sufficient water to breed a rare and small species.

(5) Different species of mosquitoes have as well-defined habits as different kinds of birds, flies, &c. Some are domestic, some wild, some migratory.

(6) Most domestic mosquitoes breed in fresh water, fly short distances, and habitually enter houses.

(7) Most migratory mosquitoes breed in salt and brackish marsh areas, and can fly long distances. They are not conveyers of malaria.

(8) Rigid tests, both direct and eliminative, have proved that certain species of mosquitoes are the only known natural means of transmitting malaria and yellow fever. Some other diseases are known to be conveyed by mosquitoes.

(9) Of the domestic varieties, the dangerous malarial mosquitoes (several species of the genus *Anopheles*) are among the most generally distributed. They seem never to travel far, only a few hundred yards.

(10) A most common and dangerous domestic mosquito in the south and the Tropics is *Stegomyia fasciata*, which is the natural conveyer of yellow fever.

(11) Mosquitoes are known to bite more than once, as can be seen by observation, and is proved by the transmission of disease from an infected person to a new subject.

(12) Mosquitoes are a needless and dangerous pest. Their propagation can be largely prevented by such methods as drainage or filling of wet areas, removal, emptying or screening of water receptacles, spraying standing water with oil where other remedies are impracticable. Attention should be paid to cisterns, house-vases, cesspools, road basins, sewers, watering troughs, roof gutters, old tin cans, holes in trees,

marshes, swamps and puddles. As malarial mosquitoes may be bred in clear springs, the edges of such places should be kept clean, and they should be stocked with small fish. The breeding and protection of insectivorous birds, such as swallows and martins, should be encouraged. Thorough screening of houses and cisterns is necessary to prevent the spread of malaria or yellow fever. The continued breeding of any kind of mosquitoes, with the attendant menace to public health and to the life and comfort of man and beast, is therefore the result of ignorance or neglect.

UNIVERSITY OF EDINBURGH.

CERTIFICATES IN TROPICAL MEDICINE.

In the Calendar of the University of Edinburgh the following candidates are announced to have gained certificates in the department of Diseases of Tropical Climates, conducted by Dr. Andrew Davidson.

First-class Honours.

Alexander Edington, M.D.	} Equal (Medallists).
Major Owen St. John Moses, I.M.S.	
D. Morley Mathieson, M.A., M.B.	
James Sutherland Edwards.	
Major Bryson, I.M.S.	
William H. Hill, M.D.	
Charles Chaves, M.B.	} Equal.
W. M. P. Henderson	
K. R. Tampi.	
J. S. Manson.	
Robert M. Wishart.	
P. Lornie.	
J. A. MacLeod	} Equal.
Arthur Dangerfield, M.B.	
Halliday Gibson Sutherland	
W. O. Sclater.	
E. W. Dyer.	
John Hunter, M.B.	
A. M. Dick.	
A. J. S. Walwyn.	
Graham Robertson	} Equal.
John Macdonald	
Harley P. Milligan.	

Second-class Honours.

J. Theodore Young, M.B.	} Equal.
Hugh Jamieson, M.D.	
T. H. Dickson	

PRELIMINARY LIST OF SUPPORTERS OF THE COLLECTION IN AID OF THE GREEK ANTI-MALARIA SOCIETY.

UNDER THE PATRONAGE OF H.R.H. PRINCESS CHRISTIAN.

HIS EXCELLENCY SIR FRANCIS ELLIOT, G.C.V.O.,
K.C.M.G., British Minister at Athens.
His Excellency M. Metaxas, G.C.V.O., Greek Minister
in London.
Mr. Sp. Acrapulo, Liverpool.

Dr. Clifford Allbutt, F.R.S., Professor of Medicine, University of Cambridge.
 Alderman J. Ball, Lord Mayor of Liverpool.
 Mr. E. Benachi, President of the Greek Community of Alexandria (Egypt.)
 Mr. R. C. Bosanquet, Professor of Classical Archaeology, University of Liverpool, and Institute of Archaeology.
 Sir James Creighton Browne, F.R.S., Treasurer, Royal Institution of Great Britain.
 Mr. James Cantlie, Editor JOURNAL OF TROPICAL MEDICINE.
 Professor Carter, M.D., Chairman, Professional, Committee Liverpool School of Tropical Medicine.
 Dr. Caton, Emeritus Professor, University of Liverpool.
 Mr. T. E. Colleutt, F.R.I.B.A., President of the Royal Institute of British Architects.
 Mr. M. Corgialeno, President of the Greek Community in London.
 Vice-Chancellor A. W. W. Dale, University of Liverpool.
 Professor the Rev. S. R. Driver, Regius Professor of Hebrew, Oxford.
 Sir John Evans, F.R.S., President, Royal Numismatic Society.
 Dr. Frazer, LL.D., Trinity College, Cambridge.
 Mr. J. Garstang, Institute of Archaeology.
 Mr. Griffiths, United States Consul, Liverpool.
 Professor Herdman, F.R.S., President of the Linnean Society of London.
 Sir Alfred Jones, K.C.M.G., Chairman, Liverpool School of Tropical Medicine, and President, Liverpool Chamber of Commerce.
 Professor Macalister, M.D., St. John's College, Cambridge.
 Dr. Mahaffy, D.D., Trinity College, Dublin.
 Mr. B. A. Malandrinis, Greek Consul in Liverpool.
 The Right Hon. Viscount Mountmorres.
 Sir Shirley Murphy, Medical Officer of Health, London.
 Mr. A. Natzio, Manchester.
 Mr. G. Hall Neale, President, Liverpool Academy of Arts.
 Mr. P. E. Newberry, Institute of Archaeology.
 Sir Christopher Nixon, LL.D., Ex-President, Royal College of Physicians, Ireland.
 Dr. G. H. F. Nuttall, Ph.D., Professor of Protozoology, Cambridge.
 Dr. Osler, F.R.S., Professor of Medicine, University of Oxford.
 Mr. Alex. Pallis.
 Mr. Rushton Parker, F.R.C.S., Professor of Surgery, University of Liverpool.
 Sir Richard Douglas Powell, Bart., M.D., President, Royal College of Physicians.
 Mr. G. C. Ralli, Liverpool.
 Messrs. Ralli Brothers, London, Liverpool, Manchester, &c.
 The Right Hon. Lord Rayleigh, O.M., President of the Royal Society.
 The Right Hon. Lord Reay, G.C.S.I., LL.D., President of the British Academy.
 His Excellency Sir John Rodger, K.C.M.G., Governor of the Gold Coast.

Dr. J. Rutherford, Harrogate.
 Mr. Watson Rutherford, M.P., Liverpool.
 Dr. C. G. Savas, Professor of the University, Athens.
 A. E. Shipley, Esq., F.R.S., Cambridge.
 Mr. J. J. Stavridi, Greek Consul-General in London.
 The Right Hon. Lord Stanley, K.C.V.O., C.B.
 Mr. D. Steele, Lake Kopais Company, Greece.
 Dr. Traill, LL.D., Provost of Trinity College, Dublin.
 Sir Frederick Treves, Bart., F.R.C.S.
 Robert Wallace, Esq., F.R.S.E., Professor of Agriculture, Edinburgh University.
 Sir Henry Wood, Secretary, Society of Arts, London.
 Mr. G. Zlatano, Manchester.
 Mr. G. B. Zochonis, Manchester.

Geographical Distribution of Disease.

As information arrives we publish, under this heading, the principal diseases met with in tropical and sub-tropical countries, so that those interested in the Geographical Distribution of disease may have a means of gathering information concerning the prevalent ailments in different parts of the world.

PREVALENCE OF CANCER.

To the Editors of the JOURNAL OF TROPICAL MEDICINE.

SIRS,—In reply to your correspondent, Dr. Branch, I would mention that I can recall, during a practice here of eleven and a half years, four cases of epithelioma in Soudanese slave women brought to Morocco, and without any admixture of Arab blood. They came under notice at a late stage, and died with disseminated growths. I may have had more in the dispensary, but my case books do not mention the colour or race of the patients.

I think cancer of all kinds, except rodent ulcer, which I have never seen here, is at least quite as common as in England. Of course, the Arabs largely predominate over the pure blacks. My work, being confined to women and children, excludes case of cancer special to men.

Yours faithfully,

Women's Hospital,
Tangier, Morocco.

GABRIELLE BREEZE, M.B.

India.

Malignant Diseases.—At the London Mission Hospital Tammaladugu, Southern India, the following operations for malignant diseases were performed during 1905:—

Epithelioma—arm (excised)	1
loin „	1
anus „	1
penis, partial removal	1
total extirpation	1
tongue, removal of half	1
cheek and lip	3
lower jaw, half removed	4
palate	1
scirrhus of breast amputation	8
Sarcoma breast, amputation	1
Rodent ulcer	1
Myosarcoma buttock	1
Lymphadenoma	1
Cancerous degeneration of ovarian tumour	1

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"The China Medical Missionary Journal," September, 1906.

I. AN UNDESCRIBED FORM OF ASCARIS AND ITS EGG.

Logan, O. T., writing from China (place not stated) states that he has found an undescribed egg in the faeces. The egg may be, he suggests, an abortive or partially developed egg of a lumbricoid. He has further noticed that the parent female worm has a constriction about one-sixth inch wide, which encircles the body at the junction of the middle and anterior thirds. These observations correspond to those made by Dr. Crichton Wellman in South Africa, who found a worm with a constriction similar to that described by Dr. Logan, who asks if this is a new species.

An interesting clinical fact noted by Dr. Logan is that he had seen a round worm passed by the urethra.

II. From Hangchow, Fokien, a communication concerning the prevalence of diseases was as follows: (1) Beri-beri: rare, a few cases in twenty-five years, not endemic. (2) Cholera: sporadic cases only. (3) Dysentery: common, mostly chronic, mortality not high. (4) Hernia: very common. (5) Malarial fever: common and virulent. (6) Plague: no plague. (7) Pneumonia: common and deadly. (8) Typhoid: common, but of mild type. (9) Urinary calculi: several cases every year operated on.

Of the diseases enumerated in this table, the most unexpected is the frequency of hernia. Most observers in China hitherto have constantly remarked upon the extraordinary few cases of hernia seen amongst the Chinese.

III. SUICIDES BY OPIUM IN CHINA.

In the annual report of the Chinese Hospital, Shantung Road, Shanghai, for the year 1905, the number of attempted suicides by opium is remarked upon. No fewer than 318 cases of this nature were brought to the Hospital, 196 being males and 122 females. Of this number, 25 died and 293 recovered. When one thinks of the number of cases never brought to hospital, and that the above figures represent the cases brought to one hospital only, the extent of attempts upon life by this means throughout the length and breadth of China must be appalling.

IV. MALIGNANT DISEASES IN CHINA.

Dr. Kuhne, in his report of the Tungkun Hospital, states: "Cancer and epitheliomata are not so frequent as in Europe; on the other hand, fibromata have a tendency to become malignant, and lymphadenomata are often a cause of death."

"Journal of Amer. Med. Soc.," April 28, 1906.

I. A REVIEW OF CANCER IN THE UNITED STATES OF AMERICA, ACCORDING TO THE TWELFTH (THE LAST) CENSUS. By Guthrie McConnell, M.D.

Conclusions.

- (1) That cancer appears to have actually increased in the United States; 12.1 deaths per 100,000 population in the past ten years.
- (2) That the death-rate is higher in the rural districts and small towns than in the cities.
- (3) That native whites suffer much less than the foreign whites.
- (4) That the death-rate amongst the foreign whites in the United States is only apparently greater than in their own homes.
- (5) That 63.1 per cent. of all cancer cases are in women, and 36.9 per cent. in men.

(6) That those employed in hard outdoor work have a higher cancer mortality than the sedentary classes.

(7) That the areas showing the greatest mortality are mountainous regions that are well watered and timbered.

(8) That cancer does not seem to be generally more prevalent along rivers.

(9) That those cities in which there are both a large German population and large brewing interests do not show a corresponding increase in cancer mortality.

(10) That cancer mortality is greatest in persons of 65 years and over.

(11) That the average age at death is 58.1 years.

II. MALARIA INFECTION IN CERTAIN NATIVE VILLAGES OF THE CANAL ZONE. By A. I. Kendall, M.D.

Summary and Conclusions.

(1) Malaria existed in certain towns of the Canal Zone at the time this work was done to such an extent that over 50 per cent. of the native born and 70 per cent. of the foreign born harboured parasites in their peripheral circulation.

(2) This high percentage of infection does not necessarily mean that a corresponding number present febrile symptoms; in fact, many do not.

(3) This high percentage of infection is a menace to the health of those who, by reason of their work, may be compelled to remain in such towns, particularly because of the wide distribution of the *Anopheles albipes*, a mosquito shown to be capable of transmitting malaria. Other *Anopheles* to a lesser extent may also be factors in distributing malaria.

(4) The æstivo-autumnal malaria is the prevalent type; the Chagres fever is, in all probability, a severe æstivo-autumnal infection. Pernicious malaria is not caused by a new parasite, but by an æstivo-autumnal organism of exalted virulence.

(5) Natives and their descendants or, in general, the descendants of those who have lived continuously on the Isthmus of Panama for many years, at birth have, to a certain degree, an inherited immunity; an active immunity, which is by no means absolute, is generally acquired, becoming manifest at about the age of 16. The foreign born acquires a tolerance to the malarial organism; this tolerance, however, is not as great, nor does it begin as early, as is the case with natives.

(6) Malaria is an environmental disease; occupation has very little to do with the cause of this disease.

(7) Quinine in moderate daily doses, while not absolutely guaranteeing freedom from malaria, or completely driving organisms from the circulation, has an important preventive and curative effect.

"C. R. Soc. Biol.," T. lx., p. 659.

SERUM REACTION DURING THE COURSE OF MEDITERRANEAN FEVER.

Soulie, H., and Garden, V. In thirteen cases in which the agglutinating power of the serum was tested daily, the authors found this variable; and in the same patient the power might disappear altogether on certain days. The serum reaction of 122 patients, suffering from different diseases, for the *M. melitensis*, was always negative up to $\frac{1}{10}$. The agglutinin is destroyed by heating for five minutes to 60°, a quite exceptional fact, which is duly emphasised.

A CASE OF INVASION OF THE OVARY OF A CRAB BY THELOHANIA MENADIS.

Pérez, Ch. (*ibid.*, p. 1091), describes an exceptional case in which the ovary of the crustacean was infected by this microsporid in the stage of young sporonts. The parasite had completely invaded the ovary, forming the greater part of the mass. There were a few healthy oöles, some foci of germinal proliferation, eosinophile amoebocytes, and reticules of follicular phagocytes, evidently engaged in absorbing large vitelline patches, which were evidently the remains of large oöles.

THE BACILLI OF A DYSENTERIFORM EPIDEMIC AT TUNIS.

Nicolle, C., and Cathoire (*ibid.*) isolated two forms: (1) A bacillus of a strain resembling that of Shiga and Chantemesse, and differing from that of Flexner II., which ferments maltose, dextrine, saccharose, and soluble starch only, and produces only indol in peptonised water. The ingestion of a few drops of the culture was sufficient to produce the disease in a young rabbit. (2) A mobile bacillus, the cultures of which smelt like those of *B. coli*. Subcutaneous inoculation of an adult rabbit with 1 cc. of this culture in bouillon failed to reproduce the malady. It produced indol in peptonised water, but did not ferment lactose. It did not agglutinate with dysenteric serum, and the corresponding serum did not agglutinate the micro-organism of true dysentery.

THE EXPERIMENTAL STUDY OF BERI-BERI.

Salanone, Henri (*ibid.*, p. 1117). The research in question was made in the bacteriological laboratory of Hanoi, and consisted in inoculating the dura mater or substance of the pectoral muscle of pigeons with an emulsion of the pneumogastric nerve of a beri-beri case. There resulted a progressive paralysis of the legs and wings.

The blood and pulp of the internal viscera of the same patient proved to be harmless when employed in the same way.

From these pigeons M. Salanone has isolated a diplococcus having many of the characters of that described by Okata and Kokubo. It will not stain by Gram's method, slightly clots milk, and attacks lactose.

The cultures on bouillon and on serum have a smell like stale fish. This microbe kills rabbits, mice, guinea-pigs, pigeons, fowls, and monkeys when inoculations are performed either *via* the dura mater, the peritoneum, or the trachea, and when the case terminates quickly, the lesions of acute beri-beri are very obvious.

Marked vaso-motor paralysis, with congestion of the internal organs, degeneration of the heart muscle, effusions into the peritoneum, pleura, and pericardium. A pure cultivation of the diplococcus was recovered from the heart-blood of the mouse. In fowls and monkeys this disease takes a chronic course, and in the monkey it recalls the "dry" form of beri-beri, with polynephritis, typical paralysis of the extensors of the limbs, marked wasting, and, to a certain extent, muscular atrophy.

"Philippine Journal of Science," T. I., p. 169.

BERI-BERI IN THE JAPANESE ARMY DURING THE LATE WAR.

Herzog Maximilien. In August, 1905, the author proceeded to Japan, to study beri-beri, of which some 80,000 cases had occurred in the Japanese Army, and to study a coccus, which was believed to be the cause of the disease by the Japanese physicians, Okata and Kokubo. The coccus was described by the latter in the *Journ. Milit. Surg. Assoc.*, September, 1905, as follows, and was named by them *Kakkeococcus* :—

"A diplococcus, scantily found in the blood of cases of beri-beri, immobile, without capsule, and staining well with aniline colours. By pricking the region of the trapezius after cleansing the skin, they found this coccus in the blood in 65 cases, both by culture and by the examination of cover-slips; in 11 cases by the examination of the latter only, the cultures being negative; in 19 cases by culture, the microscopic examination being negative; while in 34 cases the examination was absolutely negative. The diplococcus grows rapidly on gelose at 37°, and very slowly at 10°. In bouillon, 37°, there was a greyish deposit at the bottom of, and adhering to the sides of the tubes, the liquid remaining quite clear; in gelatine no liquefaction; in serum a fine grey cultivation; on potato a bright yellow deposit; does not ferment sugar; and does not clot milk. They isolated the same microbe from the urine 15 times, and from the stools in 45 cases."

The results of inoculating animals with the blood of beri-beri cases, with cultures of the coccus, or with the spleen of infected mice were indecisive: 3 rabbits out of 21, and 15 mice out of 64 succumbed, while 7 guinea-pigs all survived. Kokubo has prepared a serum by inoculating rabbits, which in a hanging drop agglutinated the coccus in a dilution of 1 per cent. in two hours.

Following Kokubo's methods, Herzog succeeded in isolating the coccus from the urine in 8 out of 40 cases, but he failed to isolate it from the blood of patients; and he points out that the precautions taken by Kokubo would not prevent the blood obtained from being contaminated by the secretions of the sudorific and sebaceous glands. They were not allowed to take blood directly from the median cephalic vein.

In the only autopsy that could be obtained the coccus was isolated from the kidneys and the meningeal fluid.

On returning to Manila, Herzog inoculated monkeys and other animals with the coccus, but, as yet, with indecisive results. He is, however, continuing his researches.

"Archiv. f. Schiff. und Tropen-Hyg.," T. x., p. 399.

PRELIMINARY NOTICE ON THE KAKKEOCOCCUS AS A CAUSE OF BERI-BERI.

Truzuki obtained a diplococcus 7 to 8 μ by 4 to 6 μ from the urine in 18 out of 65; and from the stools in 22 out of 30 cases of beri-beri. The organism exhibited only the Brunonian vibration, and was a facultative anaerobe which produced no spores, and did not liquefy gelatine. It is stained by Gram's method, and grows on ordinary media at laboratory temperature, but best at 37°. Either in culture media or in the intestine it produces a toxin, which acts selectively on the nervous centres.

The author claims to have reproduced the characteristic symptoms of beri-beri in animals, but only by intra-cerebro-spinal inoculation, and states that his microbe agglutinates with the serum of patients affected with the disease. He further states that his diplococcus may be found in the intestine of healthy persons, but regards this as a parallel case to that of such persons acting as carriers of the cholera vibrio. It may be noted that this organism stains by Gram's method, whereas, as noted above, Herzog found that Kokubo's coccus did not do so. Altogether it seems doubtful if Truzuki is really dealing with the same organism, and it seems more than doubtful that his can be considered the true organism of beri-beri.

"Journ. Americ. Med. Assoc.," April 28, 1906.

GENERAL INFECTION BY A PROTOZOON PRODUCING A PSEUDO-TUBERCULOSIS OF THE VISCERA.

Darling, Dr. J. T. Writing from Acton, in Panama, the author describes a curious case of what appeared to be general miliary tuberculosis, but which on *post-mortem* examination proved to be due to an invasion of the organs by bodies which he regards as protozoa, for which he proposes the name *Histoplasma capsulata*. The supposed protozoa consisted of round or ovoid bodies about three microns long, provided with a sort of capsule, contents of which are variable as regards chromatin. They present some resemblance to the Leishman-Donovan bodies, and were sometimes combined into irregular masses like miliary tubercles. In the lungs these bodies occupied the interior of the alveolar epithelial cells, and in the liver the endothelial and hepatic cells. In the spleen and bone-marrow, on the other hand, the parasites were free in the plasma, though they were also found within the mononuclear leucocytes. He has since met with a second case of the disease.

"Philippine Journ. Sc.," 1906, p. 533.

TROPICAL SPLENOMEGALY.

Wooley, Paul G. The symptoms of seven cases observed by the author had much in common with Kala-Azar: Diarrhœa, enlargement of the spleen, transitory œdema an irregular temperature, rheumatoid pains, wasting and

feebleness, and probably anæmia. Hypertrophy of the liver is not a constant symptom, and quinine proved useless, the most important symptom being the hypertrophy of the spleen. In the Philippines, at any rate in Wooley's cases, the symptoms are not due to the *Piroplasma Donovanii*, nor did they appear to be referable to the effects of malaria or syphilis; but he regards them as rather of intestinal origin, and due to ulcerations or other inflammatory lesions. In one of his cases, diagnosed as an instance of "Banti's" disease, Wooley isolated, both before and after death, a microbe in the form of a rodlet or diplococcus, staining well by Gram's method, and yielding a characteristic cultivation; but the injection of monkeys with the microbe gave only negative results. He concludes, therefore, that a variety of distinct morbid conditions are confused under the title of febrile tropical splenomegaly.

"C. R. Soc. Biol.," T., lx., p. 1149.

PROTOZOA OF ORIENTAL SORE.

Billet, A., found in a case originating at Ismailia, the protozoon described by Wright, Margenovski, and Bogroff, and gives a good description of the organism. With respect to the mechanism of propagation of the disease, he notes a case in which one of these sores developed exactly on the site of a mosquito bite. Now Ismailia, Touggourt, and Bokia are all places where the *Anopheles chaudoeyi* has been found, and the distribution of this mosquito in Algeria corresponds exactly with that of "Biskra boil."

Billet, A. (*ibid.*, p. 1151), on a case of intermittent œdema associated with *Filaria loa*.

The author describes a case of the above such as would be described by us as Calabar swellings. An adult specimen of *Filaria loa* was extracted from the left lower eyelid. Some time after young filaria having all the characters of *F. diurna* were found in the blood, during the day only, associated with a marked eosinophilosis.

"Deutsche Med. Wochenschrift," August 16, 1906.

Meyer found in cases of dysentery the *Entamoeba histologica* of Schaudinn.

"La Presse Medicale," April 28, 1906.

BANTI'S DISEASE.

Noumanbey maintains that the term Banti's disease should be confined to cases in which there is enlargement of the spleen of long standing, anæmia, enlargement of the liver, and ascites. He is of opinion that malaria is the cause of the disease. He found malaria parasites in one case. It may be remarked that although malaria parasites were found in one case, it is mere assumption to affirm that they stood in the position of cause and effect.

"Bulletin de l'Académie de Médecin," vol. lxx., No. 32.

PATHOGENESIS AND PROPHYLAXIS OF MALARIA.

Kelsch accepts the mosquito theory of the malaria infection, but considers that other modes of infection exist, citing turning up of the soil, exceptionally hot seasons, ingestion of dust-laden food, fatigue, and general unhygienic conditions. He asserts that the geographical distribution of *Anopheles* and malaria do not coincide. Kelsch has never known of a case of direct transmission of malaria from man to man.

"Medical Record," July 28, 1906.

Moulden W. R., from observation on prisoners in Manila, finds that copper has a selective action on dysentery due to *Amœba coli*; copper solutions are better borne than quinine; patients make a more rapid recovery under its use, gaining flesh and strength more rapidly than under any other method; and, most important of all, cases remain cured, provided, of course, that treatment is kept up a reasonable time after the disappearance of the amœba from the stools.

"Medizinische Blätter," March 8, 1906.

ANKYLOSTOMA AND MALARIA.

Schewald states that in Brazil many patients with malaria harbour ankylostomes. Anthelmintics, by getting rid of the worms, also cause the disappearance of the malarial symptoms without taking quinine.

The worms usually contain malarial parasites, which enter by the alimentary canal of the ankylostome and pass to the salivary glands, as in *Anopheles*; the parasite is not found in the ova, but malaria may possibly be transmitted or acquired through eggs.

When the ankylostome sucks blood, the malarial organisms are injected into the blood-current of the host. This may explain refractory cases of malaria, and the recurrence of attacks at the same time each year.

"British Medical Journal," October 20, 1906.

SPIROCHÆTES IN YAWS AND GRANULOMA PUDENDI.

MacHennan reports that he has discovered spirochætes in smears from a papilloma occurring in recurrent yaws. The spirochæte met with resembled the *Spirochæte pallida*, but the staining (by Giemsa's solution and gentian violet) proved fainter. In the granuloma tissue itself a few organisms resembling *Spirochæte refringens* were seen, and a number of highly refractive very long spirochætes with fine and close waving were found, but no organism resembling the *S. pallida*.

"2nd, 3rd, and 4th Memoires of the French Mission to Rio de Janeiro, to Study Yellow Fever."

HEREDITARY TRANSMISSION OF YELLOW FEVER GERMS BY STEGOMYIA.

Marchoux, E., and Simond, P. L. Having proved that infection of *Steg. fasciata* by *Nosema stegomyia* is usually effected by heredity, the authors endeavoured to ascertain if the same is the case with the yellow fever germ, and have succeeded in infecting a healthy subject by causing him to be bitten by a female *Stegomyia*, hatched out from a batch of eggs laid by an infected female. Epidemiological facts, however, appear to show that hereditary infection cannot persist through several generations of mosquitoes, and that it plays but a small, though by no means negligible, part in the propagation of the disease. It is obvious, however, that the destruction of eggs and larvæ assumes a new importance in prophylaxis.

We as yet know but little of the conditions that bring about an increase or diminution of the virulence of the virus within the mosquito. May it not be the case that hereditary transmission has an attenuating action? Should further experimentation show that mosquitoes infected in this way communicate only a mild form of yellow fever, it may be important to ascertain if inflammatory bilious fever, which is usually considered to be a form of yellow fever, may not be simply due to this method of communication.

INFECTION OF STEGOMYIA BY CONTACT WITH DEAD INFECTED MOSQUITOES.

Three series of experiments were conducted by the authors to ascertain if this is possible, and their results are negative, and larvæ placed in a flask containing dead infected *Stegomyia* developed into adults which showed no sign of virulence.

The authors have often observed that *Stegomyia* avoid parts of the skin fouled with the excretions of patients. If, then, such excretions are virulent, which, however does not appear to be the case, the mosquitoes would not become infected in this way.

It appears that a fairly high temperature is necessary for the development and preservation of the infection within the mosquito after it has absorbed the virus of yellow fever, but the exact conditions of temperature cannot, as yet, be stated.

An orang and a chimpanzee were made to be bitten by infected *Stegomyia* obtained from Brazil, and seven and nine days after both animals showed an elevation of temperature but without other symptoms that could be interpreted as certainly due to yellow fever.

All attempts at infecting animals with cultures made *in vitro* having failed, efforts were made to cultivate the virus *in vivo* within mosquitoes.

Infected mosquitoes were ground up with glucose and physiological solution and fed to *Stegomyia*, which were subsequently made to bite a man. As a result, the subject of the experiment developed a distinct form of yellow fever. It follows, therefore, that infection can be conveyed from one mosquito to another, but only by methods practicable only within the laboratory. It affords, however, a convenient method of producing infected mosquitoes for experimental purposes.

Experiments on the conveyance of yellow fever by mosquitoes of other species than *Stegomyia fasciata* have proved negative. It may be added that in most other species the female dies immediately after laying a first and only batch of eggs, and that this circumstance hardly admits of sufficient time for the virus to develop within her.

The authors have proved that this is the case with *Culex fatigans*, *C. teniorhynchus*, *C. coquimbatus*, *Janthinosoma musica*, *Psorophora ciliata*, and *Taniorhynchus Arribalzaga*. *Stegomyia fasciata*, on the other hand, can lay six or seven batches of eggs, provided she obtains a feed of blood after each, and, in the free condition, produces on the average two or three batches.

Researches into the life-history of *S. fasciata* showed that it can bite man either by day or by night from the first days of its adult life. After a few days, however, particularly after laying her first batch of eggs, she bites only during the night, and it therefore follows that man becomes infected almost universally during the hours of darkness. A feed of blood is indispensable to the mosquito for the production of eggs.

The authors further give new ideas as to infantile yellow fever; abortive forms of the disease—immunity, relapses, and the endemicity of yellow fever.

For the preservation of specimens of mosquitoes they recommend enclosing the insects in glass cells, the feet being stuck down with Canada balsam.

The abstractor has, however, tried this plan, and found it difficult to prevent the development of moulds on specimens preserved in this way in a warm, damp climate.

In the fourth memoir are given descriptions of the microscopical lesions found in yellow fever, accompanied by some fine coloured plates. They regard yellow fever as a sort of generalised stentosis, all the organs being more or less affected with fatty degeneration. The glands of the skin and intestine, and the epithelial investment appear, however, to always escape. The tissues were fixed in Borrel's liquid, and stained with magenta-picro-indigo-carmin, or fixed in acidified perchloride and stained with hæmatin and orange solution.

"Arch. Inst. roy. de Bacter., C. P.," 1906, p. 127.

THE TRYPANOSOMES OF AMPHIBIANS.

França, C., and Athias, M., found six *Rana esculenta* from the neighbourhood of Lisbon infected by trypanosomes which they identify as *T. rotatorium* (Mayer), but conclude that two species are really included under the name: *T. concalum* or *costatum* (Mayer), with an ovoid, usually fairly broad body, and striated or unstriated with centrosome near nucleus; and *T. rotatorium* (Mayer), with the body more slender, the centrosome placed near the hinder extremity, and a very well-developed undulatory membrane extending the whole length of the body.

Commenting on the paper in the *Bulletin de l'Institut Pasteur*, September 30th, p. 756, Prof. F. Mesnil states his opinion that had the authors examined a larger number of infected frogs they would have met with intermediate forms

and would also find forms with the hinder extremity as elongated as the *T. mega* and *micro-karyozetion* of Dalton and Todd. In any case he regards the constitution of new species as "a little premature."

The diagnosis of these proposed new forms is: *T. undulans*, 30 by 6-9 microns, with broad undulatory membrane and no free flagellum. *T. elegans*, of same length but only 3 microns wide. They have also met with Sergeant's *T. inspinatum*.

The authors lay great stress on the globular or retracted forms assumed by the large trypanosomes after issuing from the vessels, the fate of which had already been made out by Danilewsky, and have followed the process in two individuals from the assumption of the globular form to the disappearance of the undulatory membrane and flagellum. They saw one of the two undergo division into eight segments each with its own nucleus, and finally all degenerate, but they were unable to follow the process in stained preparations.

The same observers in the *C. R. S. Soc. Biol.*, T. lx., p. 1108, describe the phenomena of the division of *T. rotatorium* *S. Str.* from *Hyla arborea*. It takes a rounded form, losing its membranes and flagellum. The blepharoplast and nucleus divide, the former appearing to play the part of a centrosome in the division of the nucleus. This is especially clear in the process of passing from the second to the fourth nucleus stage, although the authors do not state that it is effected by mitosis.

In preparations fixed at once only the initial stages can be found, the other stages being only obtainable in preparations kept five hours between cover and slip previously to fixation.

EXCHANGES.

Annali di Medicina Navale. Annal d' Igiene Sperimentale. Archiv für Schiffs u. Tropen Hygiene. Archives de Médecin—Navale. Archives Russes de Pathologie, de Médec. Clinique et de Bacteriologie. Australasian Medical Gazette. Boletin de Medicina Naval. Boston Medical and Surgical Journal. Bristol Medico-Chirurgical Journal. British and Colonial Druggist. British Journal of Dermatology. British Medical Journal. Brooklyn Medical Journal. Caducée. Clinical Journal. Clinical Review. Giornale Medico del R. Esercito. Hong Kong Telegraph. Il Policlinico. Indian Medical Gazette. Indian Medical Record. Indian Public Health. Interstate Medical Journal. Jahresbericht. Janus. Journal of the Royal Army Medical Corps. Journal of Balneology and Climatology. Journal of Laryngology and Otology. Journal of the American Medical Association. Journal of Experimental Medicine. La Grece Medicale. Lancet. Liverpool Medico-Chirurgical Journal. London and China Express. Medical Brief. Medical Missionary Journal. Medical Record. Medical Review. Merck's Archives. New York Medical Journal. New York Post Graduate. Pacific Medical Journal. Philippine Journal of Science. Polyclinic. Revista de Medicina Tropical. Revista Medica de S. Paulo. Sei-i-Kwai Medical Journal. The Hospital. The Northumberland and Durham Medical Journal. Transactions of the American Microscopical Society. Treatment. West India Committee Circular, West Africa.

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To illustrate paper by ANDREW BALFOUR, M.D., "Rodent Ulcer in a Nubian Woman."

Original Communication.

RODENT ULCER IN A NUBIAN WOMAN.

By ANDREW BALFOUR, M.D., &c.

Director Wellcome Research Laboratories, Gordon College,
Khartoum.

GENTLEMEN,—In view of the letter from Dr. Branch, of St. Vincent, which appeared in your issue of November 1st, asking if any of your readers have observed rodent ulcer in negroes, the accompanying photographs of a Nubian woman suffering from that condition may be of interest (see Plate).

The patient, who, at the time the photographs were taken, was under the care of Major Bray, E.M.C., was aged about 60, a native of Nubia, and had lived in Egypt for a long time as a slave. She returned to the Sudan in 1901, and went to live at Kodok (late Fashoda) on the White Nile. While there she developed an ulceration at the right side of the root of the nose. This was scraped and healed. A nodule then appeared at the inner canthus of the right eye. The growth broke down and formed a typical rodent ulcer, which at the time the photograph was taken had persisted for one year, and for which the patient refused any treatment. It will be noted that she possessed rather a leprous type of countenance, though there was nothing to indicate that she was suffering from leprosy,

November 21st, 1906.

A BLOOD-SUCKING HEMIPTERON.

By HAROLD H. KING.

Economic Entomologist to the Wellcome Research Laboratories.

As will be seen from the second report of the Wellcome Research Laboratories, the Sudan is by no means deficient in blood-sucking diptera, and since that report has been issued several species, hitherto unrecorded from this country, have been captured. Particulars of these will appear in due course, but in the meantime the occurrence of a blood-sucking insect belonging to a different natural order, viz., *Hemiptera*, seems worthy of notice.

This little bug is one of the family *Reduviidæ*, sub-order *Heteroptera*, and is therefore allied to the Ochindundu (*Phonergates bicoloripes*, Stall.) recorded in the JOURNAL OF TROPICAL MEDICINE of April 2nd and April 16th of this year, from Angola as feeding on ticks and occasionally attacking man. Up to the present I have been unable to ascertain its species owing to the scantiness of the available literature, but some idea of its general appearance may be gathered from the following sketch and description.

Length, 2.25 by 2.5 microns.

Head black, with posterior margin brownish; compound eyes black; two brown ocelli above and slightly posterior to the compound eyes.

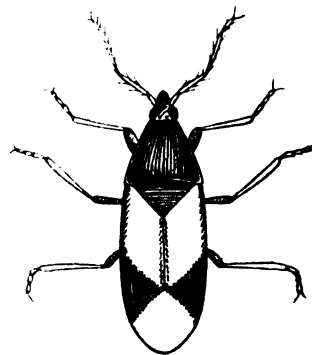
Proboscis three jointed, of medium length, black with a brownish tinge.

Antennæ four-jointed and inserted low on the head. First joint black and slightly swollen; second, longer

and tinged with brown; third and fourth, slender, brownish. All, especially the two apical segments, bear hairs.

Thorax greenish black; scutellum of moderate size, black, tinged with brown.

Wings, front pair, basal portion yellowish, a dark triangular patch on the costal border, apical portion membranous, hind pair membranous.



Line | indicates natural size.

Legs, coxæ and femora blackish, trochanters, tibiae and tarsi yellow; femora of fore pair swollen; tarsi three-jointed, abdomen black, fringed with pale hairs.

Head, thorax and abdomen sparsely clothed with short, pale, backwardly-projecting hairs.

Most of the members of the family *Reduviidæ* are predacious in habits, preying upon insects, and several species have been noticed attacking man, generally when handled or otherwise molested. I have not seen the young forms of this Hemipteron, but the adult was frequently taken during the evenings of the month of October, biting the hands and wrists without provocation. In captivity, if placed on the hand during the day it would not hesitate to at once plunge its proboscis into the skin and commence to feed, causing a sharp, stinging pain. A small red lump was the only after effect noticed, and this usually soon disappeared.

DENGUE IN EGYPT.

By LLEWELLYN PHILLIPS, M.D., B.C., M.A.Cantab.,
F.R.C.S.Eng., M.R.C.P.Lond.Professor of Clinical Medicine, Egyptian Government School
of Medicine, Cairo.

DURING this past summer and autumn there has been an epidemic of dengue in Egypt, and a large number of cases came under my observation. The earliest cases that I saw were not at all typical, for in several the fever lasted seven to ten days and there was no rash, and I thought they were either influenza or some undescribed form of simple fever; but as time passed they became more typical, severe pains being a marked feature of the cases, and rashes began to appear. In Cairo the epidemic was at its height in September and October, large numbers of officials who returned from leave at the beginning of October

falling victims. Not only did Europeans suffer, but many Egyptians as well.

In most cases the disease ran its course in about a week, the initial fever lasting two to five days. In some instances there was a rigor during the course of the initial fever; the terminal fever, however, was not always noted. In several cases there were very severe pains in the eyeballs, and in some, pain in the testicles. The terminal rash took several forms; whilst many had the typical morbilliform rash starting on the hands and spreading to the body, in others it took the form of an erythematous blush. In two instances I noted typical urticaria, one patient being taken ill with pains and slight fever on a Friday night, on Saturday night a rigor occurred, the temperature falling to the normal at 2 a.m. on Sunday morning. On Tuesday morning, a typical urticarial rash appeared all over the body without a rise of temperature being noted, and lasted about twenty-four hours. In others it took the form of purpura. An Egyptian whom I saw in consultation on the sixth day of his illness had a copious petechial rash over his hands, arms, and chest, and also had hæmorrhages from the nose, stomach, and rectum. The case looked somewhat like typhus, but the temperature was beginning to fall, the mental condition was quite clear, and the patient's appetite was returning. The temperature was normal the next day. I met him out at the Pyramids a few days later, quite well; he was, however, rather weak. In the case of a little Egyptian girl, a few days after the apparent termination of the disease there occurred profuse epistaxis and a copious purpuric rash with vibices, and large blood-stained blebs on the lips. In many instances the secondary rash was absent.

On more than one occasion I saw epistaxis occur as a sort of crisis. Hæmorrhages were a marked feature of the epidemic in Luxor and other towns in Upper Egypt.

In two instances I saw a second attack in the same patient. A young Englishman was taken ill in September with severe pains and fever. These lasted about three days, then he was free from fever and pain for two days, then they both recurred for a day; there was no rash. I saw him again in October with similar symptoms, and this time he developed with the secondary fever a typical morbilliform rash.

I only saw one death. This patient's urine was, however, loaded with albumen, and he died with uræmic symptoms, the temperature running up to 107.2° F., in spite of the application of cold packs.

Thus I observed great variety in the secondary half of the disease, fever occurring without rash, and rash without fever, unless it was so transient as to be overlooked, and neither or both occurring. Lastly, as I have described above, there was a great variety in the rashes. The occurrence of hæmorrhagic forms of the disease is especially noteworthy.

As regards treatment, I found aspirin or salicylate of soda the best means of relieving pain, with, in some cases, local applications. Feeding I did not worry much about, there being in many cases little or no desire for food of any kind, and as long as they took plenty of fluid I was quite satisfied. In some instances there was much vomiting and abdominal pain. For the hæmorrhagic cases and for the urticarial cases I

used calcium chloride, which gave much relief in the urticarial cases. When there was much sleeplessness I found Dover's powder useful, but given in a large dose. As much weakness and depression was left behind I used to conclude treatment with strychnine and quinine, or arsenic and iron.

VOMITING SICKNESS OF JAMAICA.

By C. W. BRANCH, M.B., C.M.

In the Annual Report of the Senior Medical Officer of Jamaica for 1904-5, and again in that for 1905-6, Dr. Errington Kerr refers at some length to a condition there known as vomiting sickness. At his suggestion the Government of Jamaica issued a circular to the other West Indian Governments, asking if such a disease had been observed in other places by the medical men.

NOT A SPECIFIC AILMENT.

After a careful examination of the reported cases and the remarks of several of the Jamaica medical officers, one comes to the conclusion that the vomiting sickness is not a disease *sui generis*, but in part akee poisoning and in part a coterie of pathological conditions characterised in common by the clinical features of vomiting and convulsions.

In several West Indian Islands there is some one disease, so called, to which is popularly attributed all the rapidly fatal cases of illness. In St. Kitts this is the "jaunders," in St. Lucia "pleurisie," with its varieties, "fausse pleurisie" and "pleurisie manquée," in Tortola the "biles." No doubt the vomiting sickness enjoys a similar local reputation in Jamaica.

COURSE OF ILLNESS.

Vomiting sickness usually attacks children; often several cases happen about the same time in a village, sometimes two in the same house at once. It occurs most commonly about January, but also in other months of the dry season. The typical attack has a sudden onset with pain in the belly and vomiting; after a few hours' interval of comparative relief vomiting again begins, and is followed by convulsions, coma and death. The description of the cases, however, shows that there is considerable variation in the features of the fatal illnesses which are instanced as vomiting sickness. In several mention is made of fever. Grave cases are rarely seen by a medical man, and information can only be gathered from the parents. Cases seen in life and diagnosed as vomiting sickness usually recover.

The diseases which most commonly produce the symptoms of vomiting and convulsions in negro children are ascarides and malaria. The few deaths among adults attributed to vomiting sickness are perhaps due to one or other of several acute diseases, as in the case of the "pleurisie" of St. Lucia, for example, pneumonia, bilious remittent fever, and obstruction; some, perhaps, are even due to poisoning. The description of one case, together with the *post-mortem* findings, suggests an epileptic or syphilitic epileptiform seizure.

POST-MORTEM APPEARANCES.

The *post-mortem* appearances in the cases of vomiting sickness also vary somewhat, though evidences of convulsions seem to be usually present—meningeal hyperæmia, congestion of the choroid plexus, and venous engorgement of the lungs. With regard to the other findings, it may be said that the acute congestion of liver and kidneys was no doubt produced or enhanced by high temperature. The spleen enlarged, firm and congested, suggests malaria. The full bladder indicates coma. No examination of spleen or blood has been made for malaria. One medical officer, it is true, refers to this, with an offer to make such examination if the Government would provide him with a microscope. The authorities do not appear to have availed themselves of this offer, a neglect which is perhaps pardonable, for if the gentleman has waited twenty years for someone to give him a microscope, it may be doubted what use it could be to him now.

No attempt seems to have been made to obtain analysis of the gastric contents, even in cases where suspicion of poisoning might reasonably have been entertained. In the Report for 1905-6 are the details of two *post mortems* made the same day on children of one family who had died of "vomiting sickness." The appearances described are quite inconclusive, and hardly even characteristic of disease, yet the deaths were certified to be due to vomiting sickness, and no effort was made to exclude poisoning.

MORTALITY. TREATMENT.

All the observers agree that the mortality of vomiting sickness under treatment is small. But as the same writers profess to be entirely ignorant of the nature of the condition, such treatment as is applied must be empirical and symptomatic. Dr. Tillman, however, who treated 144 cases which he diagnosed as vomiting sickness, with only two deaths, used a most rational treatment. He gave promptly *santonin* and *calomel*, followed by a course of *quinine*. The success of this procedure should have suggested the true explanation of the symptoms. The rest of his treatment is symptomatic.

ASCARIDES AND MALARIA.

The District Medical Officers of Jamaica do not attend the labourers children free as part of their official work, as we do in the Leeward and Windward Islands, consequently they have not the opportunity of knowing how much sickness there always is among negro children in their natural state. It is only when attention is attracted by the occurrence of several deaths in rapid succession, that the medical officer may be called upon to investigate and to treat the children in the locality, or supply medicines to the police to treat them. Also the districts are larger and much of the population is remote from a medical man. The peasants are therefore far less accustomed, than with us in the Lesser Antilles, to that medical aid which is deemed a necessity of civilised life. The children are of small value and are readily replaced; to take them to a doctor costs I believe four shillings. At this price it must be extremely rare that a labourer

will or can obtain medical advice for a child. With us, on the contrary, the children are frequently brought at the slightest ailment, and demands for worm powders are constant. On the whole, we must therefore have far fewer cases of grave infection with *ascaris* or malaria. Notwithstanding, we are familiar with "attacks of worms," and "worm fits," as they are called in St. Vincent, which correspond, by description, to much of the vomiting sickness. How much a West Indian population can harbour worms may be gathered from the fact that of 414 persons, mostly adults, of the labouring class, in St. Vincent, I found ova of *ascaris* in the *fæces* of 56 per cent. Of children it may be safely said that not one is free of worms unless he has been recently treated.

A DRY SEASON DISEASE.

Vomiting sickness is said to be prevalent in the months which constitute the dry season, especially January. Cases of this kind are no doubt always occurring, but they are at this period sufficiently numerous to excite alarm. In the dry season, as several of the observers point out, the people are apt to drink bad water. This means a prevalence of enteritis, due probably to *balantidium*, *cercomonas*, or *trichomonas*, all of which I have observed in St. Vincent in diarrhœas.

The consequent unrest of the worms excites reflex disturbances through the already irritated sympathetic. The general resistance, low before, is still more lowered by the diarrhœa, and these nervous disturbances are manifested as vomiting and convulsions.

Again, the dry season is the time for water-holes and rock puddles in the guts. In the heavy rains there is little opportunity for mosquitoes to breed in water-courses, but in the dry season there are occasional rains enough to fill puddles. It must be borne in mind that convulsions is often the first observed indication of a malarial attack in a child. Vomiting is common in the onset of many fevers. The combination of vomiting, convulsions and coma, with high temperature noted by some of the observers, is strongly suggestive of malaria.

THE AKEE TREE FRUIT.

In Jamaica the presence of the akee tree forms a condition peculiar to that place among West Indian Islands. The white, brain-like interior of the fruit can be eaten raw and has a nutty flavour, though it is usually cooked and makes a delicious vegetable. In the centre, attached to the shiny black seeds and extending into the lobes of the white "meat," is a pink placenta in which is a poisonous principle. These placentas should be carefully picked out of the fruit. The miserable, half-starved piccaninnies gather and eat the fallen fruit ignorant of the fatal pink membrane. The old planters of the island, living among the people and knowing more of them than do the medical officers, can give some account of the frequency of this accident.

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THE JOURNAL OF

Tropical Medicine and Hygiene

DECEMBER 15, 1906.

THE HOUSING OF EUROPEANS ON THE WEST COAST OF AFRICA.

IN the bad old times, which ended with the last century, the special plague spot of the West African town of Lagos was a certain marshy tract known to Europeans as the Kimberley swamp. Its position was such that it was obviously the most urgent danger to the health of the town, and its reclamation was the first great work of anti-malarial sanitation undertaken by that great and scientific administrator, the then Governor, Sir William MacGregor. During his only too short period of rule, anti-malarial sanitation was rigorously pushed, and the effects of his wise and effective action are shown more and more plainly every year in the health statistics of the colony, the deaths from malaria having fallen from 4 per cent. for the period 1897 to 1900 to 1.5 per cent. for the first five years of the present century. Since 1902, in fact, there has been only one fatal case of malaria, so that though there is undoubtedly much room for improvement; the benefits that have resulted from anti-malarial measures are absolutely beyond question, for the change from a pestilential mortality of 40 per mille from malaria alone to the comparatively moderate present death-rate was abrupt, and has been continuously maintained.

With such triumphant results, it might be thought

that the policy so happily inaugurated by Sir W. MacGregor would be pushed and extended by any body of reasonable men, but this does not appear to be the case unless the following allegations can be called in question.

The Kimberley swamp was very properly converted into an open pleasure ground, but it should be needless to point out that it could never become suitable for an inhabited site, as the level of the subsoil water must necessarily always remain perilously near the surface, and the sanitary objections to the occupation of sites on made ground are so well known that such a course would never be permitted in the most backward municipality in England, and in the tropics, the dangers of such sites are many times multiplied. It appears, however, to be a fact that the Local Government have actually erected quarters for European officials on the edge of this site, and are contemplating building more. The avoidance of such situations is so much a matter of the A B C of sanitary science, that it is impossible to believe that the Government can have consulted their medical officers on the matter, as to do so would be to assume a degree of ignorance on the part of the latter that is quite incredible at the present day.

Further, the bungalows in question are absolutely unsuited for the purposes of tropical residence, being planned with the usual toy verandahs, which render the provision of adequate ventilation out of the question, as to do so would involve the admission of the direct rays of the sun to the rooms for a considerable portion of the day.

It may be taken as axiomatic that the verandahs of European quarters should never be less than 12 ft., and the more that can be afforded over this the better.

In a climate such as that of the West Coast, the first essential of health and comfort is a large roof area, and provided this be sufficiently extensive, the more nearly the house resembles a bird-cage the better. In any case, the walls should be placed so well inside the area of shade cast by the roof, that the sun can never shine directly on them after it is a few degrees above the horizon.

Given these essentials, it is easy to plan doors and windows of sufficient size to admit a pleasant and healthful current of air, in spite of the wire gauze mosquito guards, which we know to be an absolute essential of safety in a mosquito-ridden country.

An ideal residence should be protected with adequate gauze-guarded verandahs on all sides, but in any case, one verandah and the dining and sleeping room should be so provided, and the verandah enclosed with wire should be that on which the sun falls least throughout the year, so that it can be used for living and working in throughout the day, which is of course impossible in the absurd apologies for verandahs that are only too common on the "West Coast." But even worse remains, for, bad as malaria is, dysentery is worse, and dysentery is undoubtedly a water-carried disease. As in most parts of the West African littoral, the water supply is one of the most formidable dangers and difficulties in Lagos, the residents having to depend on surface wells. These wells are in no case above suspicion, and it is to be feared that the best is not made of them by adequate measures of protection ;

but in the case of the new quarters in question, the wells have been sunk into the fathoms-deep organic filth of the old malarial marsh.

Of course, malaria cannot be conveyed in this way, but the consumption of such water is a well-known source of dysentery, and we shall be agreeably surprised if the unfortunate officials so supplied do not furnish a new instance of the danger of ignoring a commonplace of tropical sanitation.

It is wrong and immoral for any corporate body to subject its employees to needless risks, and if the local authorities do sufficiently realise this, surely a government which professes to concern itself so deeply with the housing of the working classes should step in and insist on the equally fair treatment for those who are bearing "the white man's burden" in our distant colonies and dependencies, by insisting on their being housed so as to be able to carry on their arduous and thankless duties under the best attainable conditions of health and therefore of efficiency. The reverse policy of stinting expenditure on the building of suitable and healthy quarters is, moreover, not even defensible from the financial point of view, as its penny wisdom inevitably results in a pound folly of needless ineffective charges to pay the salaries of officials on sick leave, who would have remained fit for work under a more enlightened régime.

LIVERPOOL SCHOOL OF TROPICAL MEDICINE, MEMOIR XXI., SEPTEMBER, 1906.

THE RUNCORN RESEARCH LABORATORIES OF THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

THESE laboratories are situated at Crofton Lodge, Runcorn, sixteen miles from Liverpool, where stabling and pasture for all sorts of animals is obtained. An important function of the laboratories is to supply living parasites for the practical instruction of students taking the course in tropical medicine at the Johnston Laboratories, Liverpool. At Runcorn the various trypanosomes, spirochætes, the ticks *Ornithodoros moubata*, *Argas miniatus*, *Ixodes reduvius*, and *Rhipicephalus annulatus* are kept "a-going" and utilised for teaching purposes.

AN EXPERIMENTAL STUDY ON THE PARASITE OF THE AFRICAN TICK FEVER (SPIROCHÆTA DUTTONI). By Anton Breinl and Allan Kinghorn.

The parasites experimented with were brought from the Congo Free State in infected ticks to Liverpool, and the strain was recovered from monkeys which had been infected through their bites. (1) It was soon shown that the spirochætes of tick differ from the *Spirochæta obermeieri* of relapsing fever, and the name *S. duttoni* was given to the tick fever spirochæte. (2) The technique of the experimental methods is given; and (3) a description of cases of African tick fever in whites. (3a) The experiments on animals show that the blood of patients suffering from relapsing fever is infective for susceptible animals during the periods of apyrexia. (4) A clinical comparison of African tick fever and European relapsing fever reveals

the truth of Koch's statement that the attacks in tick fever are shorter than in the relapsing fever of Europe, and that the spirochætes are present in fewer numbers in tick fever. The length of intervals and the number of relapses in tick fever are not yet determined. (5) In experiments to determine animal reactions of *S. duttoni* it was found that monkeys, dogs, horses, goats, sheep, rabbits, guinea-pigs, rats, and mice were capable of inoculation. The most susceptible animals are white rats, and then monkeys. Of the monkeys, the order of susceptibility was as follows:—Young mona (*Cercopithecus mona*) and young Callithrix (*Cercopithecus callitrichus*) were most susceptible, followed by Rhesus (*Macacus rhesus*), "sooty" (*Cercocobus fuliginosus*), "Jew" (*Cercopithecus* ?), and baboons (*Papio anubis*); all the monkeys, with a single exception (a rhesus), became infected. In some animals the parasites were found only in the subinoculations. Cats were entirely refractory to infection. (6) *Chronicity*. Tick fever runs an acute or chronic course; in one case recorded the patient became ill in February, and the last relapse took place on April 22nd. (7) *Virulence*. No difference in virulence was noted in strains which had passed through a long series of animals, and that derived from animals directly infected through tick bites. The numbers of spirochætes in animals experimented upon varied directly with the number present in the inoculating blood. (8) *Immunity*. No satisfactory explanation has yet been given of the disappearance followed by a reappearance of the spirochætes in the blood. There was shown to be a relatively active immunity against reinfection, as animals reinoculated at various intervals after recovery up to seven and a half months did not become infected at all, or only had a very slight attack. Treatment by horse, monkey, and rat sera showed that hyperimmune serum derived from any one of these animals does not prevent the infection, but it positively lengthens the incubation period and mitigates the course of the disease when given in large doses. No cure was effected by the immune serum. Experiments show that there is a slight degree of inborn immunity, which speedily disappears, however. (9) *Specific nature of S. duttoni*. The spirochætes of African tick fever is of a species differing from *S. obermeieri*, since each confers a relatively active immunity against itself, and not against each other. (10) *Placental transmission*. The *S. duttoni* has been shown to pass through the placenta from the circulation of the mother to that of the foetus, and that the majority of foetuses carried by infected mothers are themselves infected. The parasites in the foetus are fewer in number than in the mothers; they show no morphological change after gaining the foetal blood, nor does the mother abort. An interesting observation noted was that although the infected foetuses were born and lived, fewer reached maturity than in the case of healthy rats. (11) *The spleen in spirochætal infection*. (a) Experiments showed that the course of tick fever in animals from which the spleen had been removed does not differ from that noted in normal animals. The spirochætes appear in the peripheral circulation, increase in numbers to the maximum, then decrease and disappear from the blood. After an interval the

cycle is repeated. (b) It was shown that the spirochaetes, when disappearing from the blood, do not rest solely in the spleen. (c) Spirochaetes are present in the peripheral circulation in an infective stage on the first day after ticks are fed on a susceptible animal. (d) After recovery from the disease, animals subjected to splenectomy reacted in the same manner to reinoculation as did the controls. (12) An infective stage of *S. duttoni* is capable of passing through a Berkefeld filter, which does not allow the passage of *Bacillus prodigiosus*. (13) No definite conclusion has as yet been arrived at concerning the morphology of *S. duttoni*. (14) In experiments concerning the protozoal nature of spirochaetes, Dutton and Todd state that the transmission of the spirochaetes by ticks is not merely mechanical, and that some developmental process takes place in the tick. The passage of the spirochaetes from the alimentary canal of the ticks to the ovary and eggs is interesting, and it has not been shown to occur in the case of any bacterium up to the present, but is known to occur with protozoa. (15) The animal reactions of *S. obermeieri* are quite different from those of *S. duttoni*, and, contrary to Novy and Knapp's statements that a relapse has never been seen in rats, Breinl and Kinghorn show that if the examination is continued for a sufficiently long period relapses do occur. (16) Animals which have recovered from infection by *S. obermeieri* acquire a certain amount of active immunity against reinfection, the efficiency of which corresponds directly to the severity of the attack.

Abstract.

PARATYPHOID FEVER AND TYPHOID FEVER.

By Lieut.-Colonel D. B. SPENCER, I.M.S.

LIEUT.-COLONEL SPENCER, in a series of articles published in Mauritius (1906), deals with paratyphoid fever and enteric fever in India. He defines the ailment as follows:—

PARATYPHOID FEVER.—DEFINITION.

Bacteriologically, judging from what I have read of the subject, I should say it is a fever caused by one or more members of the typho-coli group of organisms acting either singly or collectively; that is to say, more than one organism of the typho-coli group probably take part simultaneously in the causation of the disease by a process known in bacteriology as symbiosis. But it must be clearly understood that this fever is not caused by the bacillus typhosus, the *causa causans* of true typhoid fever, for the Vidal reaction, with a culture of the *B. typhosus*, is always negative in paratyphoid fever, and it is this fact which has drawn the attention of different observers in different parts of the world to this fever. It has been observed in America, England, Germany, France and India, so that the disease may therefore be said to have no geographical limits.

BACTERIOLOGY OF DISEASE.

So far as I can gather from current literature on the subject it appears to me that paratyphoid fever is

caused by the group of bacilli known as the Gaertner group, which occupy an intermediate position between the *B. typhosus* at the one end of the chain and the *B. coli communis* at the other end.

One of the most important organisms of this Gaertner group is the *B. enteritidis*, which is the bacillus usually associated, I believe, with meat poisoning and ptomaine fever, and it is this bacillus which is generally credited with being the cause of paratyphoid fever. According to Dr. Row, of Bombay, the *B. coli communis* is not an unimportant factor in the causation of paratyphoid fever.

INTESTINAL AND SEWAGE BACTERIA.

A large number of different kinds of bacilli have been isolated of late years from crude sewage, of which the following, I believe, are fairly well-known varieties:—*B. coli communis*, with about 150 varieties; *B. cloacae fluorescens*, *B. stercoralis*, *B. frondosus*, *B. fusiformis*, *B. subtilis*, *B. subtilissimus*, *B. mesentericus*, *Proteus cloacinus*, *Proteus vulgaris*, several other species of *Proteus*, *Micrococcus aurora*, *B. enteritidis sporogenes*, of which, according to Klein, there are from 500 to 600 spores per cc. of sewage; then there are the thermophylic bacteria, of which there are some eight known varieties, and lastly we have the great streptococcus and staphylococcus families with their numerous varieties. These bacteria probably get into the human intestinal canal, for with every drop of water that we drink and with every particle of food that we eat, an immense number of bacteria enter the stomach, and although, fortunately for us, most of them are dissolved in the acid juice of the stomach, it is reasonable to infer that in the struggle to escape some of these bacteria find their way into the intestinal canal and are finally passed out with the faeces.

It is possible also that these same harmless organisms, under a new environment in the human intestinal canal, may have sometimes a share in the causation of paratyphoid fever by a process known as auto-infection or auto-intoxication from the intestinal canal.

In a paper on Paratyphoid, by two French doctors, Saquepée and Chevril, published lately in *La Presse Medicale*, the following statement occurs:—

"Two types are generally recognised, A and B. The cultures of A on gelatine, potato and agar resemble those of typhoid, while those of B are more luxuriant and recall coli cultures. Type A acidifies milk quickly and definitely (one to three days). Type B (alkalifaciens of School Muller) causes in the same media a transient acidity replaced later by a more pronounced alkalinity. Both types are very pathogenic to laboratory animals."

It will appear from the above description that paratyphoid bacilli, like the Gaertner group, occupy an approximately intermediate position between the *B. typhosus* and the *B. coli*, and they may therefore be said to be a branch if not a part of the Gaertner group.

ENTERIC FEVER IN INDIA.

Why are the natives of India apparently immune to enterica?

In this connection, I think, the chemistry of

ptomaines furnishes an important light. We know that these ptomaines are alkaloidal substances of the aromatic series of organic compounds, and that they are formed in the process of putrefaction of proteids or albuminoids derived from nitrogenous animal food, such as meat of any kind. We know also that meat is a regular article of diet for the British soldier, while in the native army a large number (Hindoo) never touch meat, fish, or eggs. Broadly speaking, the food of the British soldier consists largely of animal diet, that of the native soldier of vegetable diet (atta, rice, dal) and ghee, a carbohydrate. Again, beer is a common drink with British troops, and a British soldier can drink as much canteen beer as he likes. In the native army beer is unknown. Now beer is a thing which is very apt to ferment, especially in hot weather, and beer is drunk by British soldiers, in both hot weather and cold, without any restriction.

TRUE ENTERICA.

Etiology.—*Bacillus typhi*, Eberth's associated with sewage contamination of food or drink.

Widal Test.—Positive reaction with the *Bacillus typhi*.

Mode of incidence.—Usually in an epidemic form.

Mortality per cent.—7.14 in the last Maidstone epidemic (Poole's Report).

Chart.—Often typical. First week, gradual rise. Second week, high continued fever. Third week, gradual deferescence.

Mode of onset.—Gradual.

Rash.—Generally present 88 per cent in the last Maidstone epidemic (Poole's Report).

Typhoid state.—Early and pronounced.

Abdominal symptoms.—Whether early or late they are unmistakable.

Post-mortem appearances.—Typical ulceration of glandular structures of small intestine.

Duration of fever.—Generally three weeks.

Treatment.—The recognised treatment has been an expectant treatment with intestinal antisepsis and irrigation (Burney Yeo).

INDIAN ENTERICA (A FEVER WITH ENTERIC SYMPTOMS).

Etiology.—Probably the *Bacillus coli* associated with fermentation and putrefaction of intestinal contents and consequent auto-infection.

Widal Test.—Not known. (a)

Mode of incidence.—Usually in a sporadic form.

Mortality per cent.—About 25 per cent. in India.

Chart.—Generally irregular.

Mode of onset.—Sudden or gradual.

Rash.—Generally absent.

Typhoid state.—Often vague or altogether absent.

Abdominal symptoms.—Often absent.

Post-mortem appearances.—Often the ulceration of intestine is irregular and extensive, being not confined to glandular structures.

Duration of fever.—Three to four weeks, but it can be aborted by a specific treatment. (b)

Treatment.—The treatment I adopt is an eliminative treatment combined with intestinal antisepsis and irrigation.

(a) Now known to be negative.

(b) Instead of three to four weeks I should now say from two to eight weeks, or even longer.

Published in April, 1900, in the *Indian Medical Gazette*.

We have thus, I think, in meat and beer those elements of putrefaction and fermentation which are essential for ptomaine formation. The fact that enterica is so much more common in the hot weather than in the cold, i.e., at a time when bacterial activity

is greatest in the processes of decay, lends additional colour to this theory, and much of this striking difference in the rates of incidence of the disease between European and native troops is, I believe, due to a difference in diet of the two races.

Summarising the points dealt with in his paper, Lieut.-Colonel Spencer remarks in conclusion: It is, I think, difficult to believe that defective sanitation is the sole cause and the whole cause of enteric fever as seen in India. For, while on the one hand we can, in India, but seldom prove a causal connection between the disease and sewage contamination of food or drink, there is, I think, on the other hand, a vast array of positive evidence to show that a fever with enteric symptoms, closely simulating true enterica, (see tables) has been, and can be caused by other factors—factors which I believe are as yet not sufficiently recognised. Although spasmodic efforts have been made from time to time by a minority of original thinkers to show that they do exist, it may reasonably be asked whether, with our advancing knowledge of the subject, the time has not come for medical men in India, whatever may be their past or present convictions, to consider both individually and collectively the various points enumerated above. It is incumbent upon us to set to work to attempt to decide whether the disease we call "enteric fever" in India is always one disease arising from one cause only, or a complex disease presenting several phases and arising from a variety of causes; chief among these may be mentioned climate, food, and intestinal intoxication from fermentation and putrefaction of intestinal contents and the consequent formation of ptomaines and toxins therein of bacterial origin, though quite independently of the typhoid bacillus. For it must be obvious that, without correct premises, without a correct conception of the disease, and without an absolute unanimity among medical men as to what constitutes a correct conception of the disease, the inferences must be wrong and that there never can be any satisfactory solution of a complex and difficult subject like the enteric question.

TROPICAL DYSENTERY.—Abstract of paper in *Lancet*, of December 1, 1906, by Captain R. J. Blackham, D.P.H.R.C.P.S.Lond., Royal Army Medical Corps.

Amongst the diseases of special interest to the physician practising in the Tropics, the group of morbid conditions, known by the term of "dysentery," ranks only next in importance to enteric fever. Unfortunately, as Manson points out, our knowledge is not in proportion to the importance of the subject, and in the latest monographs on the disease it is evident that considerable doubt exists in the minds of eminent climatologists, who have made a special study of the malady, as to the exact boundary line between simple diarrhoea and dysentery. It is, however, only in very recent years that the difficulty of diagnosing dysentery has become appreciated, and a few years ago writers used to describe what is now considered to be a group of diseases as a well-defined malady and give its etiology, symptoms, and pathology in precise

terms. It would be well, therefore, to start by defining what we mean by "dysentery," and the definition suggested is that "dysentery is an inflammation of the large bowel, associated with pain, tenesmus, some slight pyrexia, and a large number of stools, consisting of mucus or mucopus, with micro-organisms but with or without blood." I think the last phrase is important, in view of Dopter's work during the past year, and the evidence which he has submitted that simple diarrhoea may be an abortive form of dysentery, and that all cases of acute diarrhoea occurring where dysentery is prevalent should be regarded as suspicious, and, where possible, bacteriological methods resorted to for diagnosis in preference to the rough-and-ready test of the character of the stools.

In the classification of the varieties of dysentery much difficulty and confusion of ideas have arisen, and as Firth points out, "it is doubtful whether the literature of any disease is more encumbered with a mass of names indicating the nature of the disorder or the author's conception of its pathology than is that of dysentery." Terms founded on a pathological basis such as "catarrhal," "ulcerative," and "gangrenous" have been passed on from text-book to text-book and are used by Manson, Scheube, and even such a recent text-book on pathology as Stengel's (p. 547), and in an article just published in the *Lancet*, but as was pointed out by Taylor as far back as 1901, the "disease is essentially the same in all varieties." Such terms merely indicate clinical conditions found in the various stages of a single pathological process, and it would be well, therefore, to dismiss this older classification and adopt the one now used by Osler, namely, (1) amœbic dysentery; and (2) bacillary dysentery. This nomenclature was, I think, first suggested by Davidson, but he added to it a third variety, which does not really exist, as his "dysentery of war" is simply a form of bacillary dysentery.

Causes of Dysentery.—In considering these we must sub-divide the heading into (a) predisposing causes; and (b) exciting causes. Let us first consider the causes which predispose to the disease. We find that these fall under four chief divisions, namely, (1) age, (2) sex, (3) occupation, and (4) conditions of lowered vitality.

(1) Age.—Dysentery may occur at any age, but in my experience it has a singular predilection for the extremes of life, children and old people being peculiarly liable, the former, doubtless, on account of their well-known liability to catarrh of the intestinal mucous membrane which is itself a predisposing cause of the disease, according to Scheube (p. 466).

(2) Sex.—According to most authorities this does not exert any influence, but Scheube cites pregnancy as a predisposing cause, and it is within the experience of most physicians who have lived in the Tropics that when dysentery occurs in a pregnant woman, or during the puerperium, the prognosis is very grave indeed.

(3) Occupation.—Davidson asserts that agriculturists are attacked more frequently than persons whose calling is carried on indoors, and according to Lancarol persons who labour in the heat, such as

stokers, cooks, and mechanics, are peculiarly liable to disease.

(4) Conditions of lowered vitality.—There can be no doubt that in conditions of health the pathogenic organisms of dysentery, enteric fever, cholera, and other diseases pass through the intestinal tract in association with the luxuriant flora and fauna which normally flourish therein, without causing any inconvenience, and that it is only when the mucous membrane of the bowel is the subject of some inflammation, irritation, or impaired nutrition that it forms a suitable nidus for the *Amœba* or *Bacillus dysenteriae*.

Such conditions of reduced vitality may be induced by a variety of circumstances, first and foremost among which I would place "chill," which Manson declares to be a "powerful excitant of dysentery," and Scheube considers, above all things, to be mentioned as a predisposing cause. Next I should place "unfavourable hygienic conditions," such as overcrowding, contamination of the soil with sewage, and an impure water supply. Epidemics of the disease are therefore peculiarly likely to occur in war and as an accompaniment of famine, and Scheube says, "In almost every long campaign or siege the outbreak of an epidemic of dysentery amongst the combatants, amongst the besiegers as well as the besieged, is a common occurrence."

Amœbic Dysentery.—This variety is essentially slow developing in its nature, although acute attacks are not uncommon. It is styled by Firth and others "endemic dysentery," and it appears to have little tendency to break out into definite epidemics, as is the case with the other form of dysentery. An amœba was first described by Lambl in 1859 and subsequently by Lösch in 1875, but to Schaudinn is due our present exact knowledge of the genuine organism. He found that many kinds of amœboid organisms occur in the human intestine and that some of these are not true amœbæ at all but merely amœboid stages in the development of the higher forms of the protozoa such as trichomonas, lamblia, and other infusorians. Genuine amœbæ he divided into two classes: (1) those provided with a shell, the thecamœbæ; and (2) those that have no other covering, or gymnamœbæ. "At least one of the former and two of the latter sort are now known to occur in the intestine." The two naked forms are genuine parasites, but one of them is harmless and the other one of the most dangerous of pathogenic protozoa. Schaudinn has re-named the former, hitherto known as the *Amœba coli*, *Entamœba*, and the latter, hitherto known as the *A. dysenteriae*, as the *Entamœba histolytica*. The *E. coli* was found in from 20 to 60 per cent. of healthy stools by Schaudinn and is a shapeless mass of protoplasm not showing much differentiation into ecto- and endoplasm but possessed of a well-marked nucleus. It is difficult to find in healthy faeces, as its habitat being in the upper regions of the colon it dies out as the intestinal faeces become firmer on their passage down the bowel. If, however, the downward course of the faeces is hurried by saline purgatives the amœbæ can be readily detected, as Schuberg has shown. "The amœbæ have two distinct cycles of development; one vegetative or asexual, taking place in the naked state, the other displaying a

primitive but unmistakeable form of sexuality and occurring inside of a capsule resembling an egg-shell and termed a cyst. In the vegetative form the amœbæ either simply split in two or their nucleus divides into eight daughter nuclei, each of which takes a portion of the protoplasm so as to form a characteristic brood of eight young amœbæ, which come apart. In the other or sexual cycle the amœba rounds itself off, comes to rest, and contracts and surrounds itself with a gelatinous coat which becomes the cyst wall. The two nuclei, after undergoing reconstruction and chromosomic reduction, divide into halves, which copulate, so as to form two fresh nuclei, each containing half of the two parent nuclei. Each of these copulation nuclei now divides twice and the divisions form eight young amœbæ which, however, cannot leave their cyst until it has been taken in by a new host and has had its wall softened in the stomach and duodenum." The pathogenic *E. histolytica* differs materially from the foregoing. It possesses a tough ectoplasm which enables it to force its way between the layers of the mucous membrane and produce the undermined ulcers of tropical dysentery. Schaudinn has actually observed the organism in scrapings of the bowel from an experimentally infected cat. "The two sorts of amœba differ also in their reproduction. The pathogenic form in its vegetative stage divides into two, or forms new individuals by budding. Brood formation does not occur. The process of encystment is also quite different. It comes on when the patient is beginning to recover from his attack of dysentery and the fæces are becoming solid. The nucleus gives up most of its chromatin in granular form to the plasma and its remains are expelled. The plasma now projects from its surface a number of little knobs, each containing a particle of chromatin and measuring from three to seven micra in diameter. These break off after a while and each becomes surrounded by a capsule which ultimately becomes quite brown, hard, and opaque. These 'spores' are then expelled with the fæces and serve to infect a fresh host."

McWeeney states that so far back as 1902 he believed that the *A. coli*, or rather, I presume, what we now know as the *E. histolytica*, was causative of one form of dysentery, and in the very excellent paper from which I have quoted above he holds that "one of Schaudinn's experiments seems quite conclusive." In this experiment this great investigator, whose untimely death we all deplore, dried a small quantity of fæces from a case of undoubted dysentery in air, and satisfied himself microscopically that it contained no cysts of *E. coli*, but only the small brown spores of *E. histolytica*. The cover-glasses were then removed from the slides actually examined, and the fæces washed off with about one cubic centimetre of sterile water and administered in food to a young cat whose stools had been proved to be free from amœbæ. Three days later the cat began to pass slimy fæces streaked with blood. These were found to be swarming with typical *E. histolytica*. Next day the animal died from dysentery. The necropsy showed characteristic ulceration of the large intestine with crowds of amœbæ in all stages of penetration into the intestinal wall. Schaudinn adminis-

tered quantities of the fæces of this cat to another, but it remained healthy. He then gave a small quantity of the dried fæces originally used, and within six days amœbæ appeared in the fæces. This cat, which was older and stronger than the first one, developed dysentery, and "died in about a fortnight." From this experiment it would appear that amœbæ taken by the mouth appear to be harmless, and that "it is to the dried-up, cyst-containing fæces present in dust and water that we must look for the propagation of dysentery."

Bacillary Dysentery.—Although it is evident from the foregoing that the *A. dysenteriae* is clearly the exciting cause of many cases of dysentery, it is equally evident that there is a very large amount of dysentery which is not due to amœbæ. In support of this we find that Bruce, Washbourn, and Birt failed to find amœbæ at all in the large number of cases they examined during the South African epidemics. Major W. W. O. Beveridge discovered amœbæ in only three out of 147 cases examined in the Army Medical Service laboratories at Pretoria. Strong and Musgrave noted 766 cases of bacillary to 561 of amœbic dysentery in their investigations in Manila, while Rogers states that the bacillary is much the most common form of the disease in Calcutta. The credit of first recognising a definite bacillus which was capable of producing dysentery is due to Chantemesse and Widal, who showed by experiments on animals that a bacillus closely allied to the *B. coli communis* was frequently present in the stools of epidemic dysentery, and capable of producing the disease in cats; but the question of the exact form of bacterium responsible for the disease was hotly disputed until Shiga, of Tokio, isolated a bacillus from the type of disease occurring in Japan, and "proved its specificity by demonstrating the agglutination of its cultures by blood serum."

Prevention of Dysentery.—(1) General. Scheube states that the general prophylaxis of dysentery demands careful attention to general hygiene and the personal avoidance of the predisposing causes, and goes on to say "The circumstance that dysentery does not now appear in the tropics with the same frequency and severity of thirty or forty years ago is to be ascribed to the improvement in hygienic conditions, especially in regard to water-supply, which has taken place during recent years and to the more rational method of treatment practised by the doctors of the present day. In order to prevent the disease spreading the intestinal evacuations should be disinfected, as should also night commodes, utensils, privies, &c., as well as the soiled linen and bed-linen used by the sick." He further recommends that when constipation occurs in the East only mild aperients should be taken, and quotes, without comment, the advice of Lancarol to take cold baths throughout the year as a prophylactic. To prevent dysentery in the tropics I would suggest that the following rules be strictly adhered to, and that, having themselves grasped their importance, all officials should be induced, by precept and practice, to enforce obedience to this simple code on their subordinates. (1) Drink only boiled or preferably sterilised water, by which I mean water not bacteriologically sterile but which has been

heated to 80° C., a temperature which is sufficient to kill non-spore-bearing organisms and certainly the bacteria of dysentery, cholera, enteric fever, and most other communicable diseases. (2) Clothe warmly, and wear a so-called cholera belt to avoid chill being communicated through the abdominal wall to the intestine. (3) Be temperate in food and drink, and remember that alcohol is a luxury and not a necessity of life, especially in the tropics. (4) Seek medical advice at once when constipated or suffering from diarrhœa, however mild in character, and avoid drastic cathartics. (5) Isolate all cases of dysentery rigorously, regard cases of diarrhœa occurring during epidemics as suspicious, and disinfect with care all diarrhœic stools and the bedding and clothing of all persons affected with dysentery or suspicious diarrhœa [5].

Treatment of Dysentery.—We are confronted at the outset with a serious difficulty. We find that the treatment of the two varieties of the disease is hopelessly mixed up by each and every authority, even in the most recent articles on the subject such as that of Dr. C. B. Sheldon Amos, and that it is almost impossible to differentiate the remedies which are to be recommended in the variety due to amœbæ from those suggested for the bacillary type of the disease. As, however, it must frequently be impossible in practice to decide the type of disease at the outset of treatment it will, I think, be best to discuss the therapeutical measures available as a whole and merely to divide our remarks under the classical headings of "acute" and "chronic."

The indications which will assist us in the treatment of dysentery are five in number: (1) To relieve the pain and tenesmus; (2) to avoid all irritation of the inflamed mucous membrane; (3) to promote intestinal antiseptics by removing foul accumulations and arresting putrefaction; (4) to counteract any morbid agency in the blood as far as may be; and (5) To support the patient's strength by suitable diet. Let us consider these indications.

Firstly, to relieve the pain and tenesmus.—As the use of opium has been unhesitatingly condemned by the older writers in the treatment of acute dysentery, the evidence of Washbourn and Faichnie is of value as expressing the most recent views on the subject. Washbourn goes so far as to say that he has seen lives saved in South Africa by the introduction of a morphine suppository, so there is now no doubt that the first indication of the treatment of acute dysentery is to give opium in some form or other, not to act as an astringent but simply to moderate and control the painful contraction of the intestines which produces what is known as tenesmus.

Secondly, to avoid irritation of the inflamed mucous membrane. In this relation I may point out that many years ago Sir William Gull summed up the treatment of acute dysentery in three words, viz: "Rest, warmth, and ipecacuanha." This was not only smart and epigrammatic but it had the advantage of being correct, and Washbourn after his exceptional experiences in South Africa, has little to add to the aphorism of the great Gull. To avoid irritation of the inflamed mucous membrane we must apply the first two of Gull's trinity of remedies. Rest is absolutely

essential, and in all cases the patient should remain in bed and use a bed-pan. All foods which leave a residue prone to decomposition must be avoided, and Manson objects even to milk in acute dysentery if the tongue is foul, and limits the diet to weak chicken broth, barley, and rice water, with a little egg albumen till the tongue cleans. Milk is, however, considered the best food in all cases by Scheube and Yeo, while Osler recommends "milk, whey, and broths."

The third indication for treatment is to attempt to produce intestinal antiseptics. This can, of course, be merely an attempt, as the bowel may be regarded as a forest crowded with flora and fauna of the most varied and septic character, but although it may be useless to try to render the mucosa aseptic, it may be possible to place it in a position which will discourage the growth of a delicate organism such as the bacillus of dysentery appears to be. There are three ways in which we may attempt to treat this indication—namely: (1) by saline aperients which sweep all foul accumulations and organisms from the intestinal tract in a more or less mechanical manner; (2) by the administration of certain drugs said to be specific; and (3) by washing out the bowel per anum by means of astringent and antiseptic fluids. In the tropics the best preliminary treatment for all kinds of diarrhœa is a dose of castor oil with or without from 15 to 20 minims of liquor opii sedativus, and Manson believes that slight cases of dysentery are often checked thereby and require no further treatment except rest and a bland non-irritating diet for a few days. Having done this the physician must elect whether he will resort to the saline, specific, or lavage method of treatment.

"Specific" Treatment.—Scheube says: "The principal drugs used in the treatment of dysentery are calomel and ipecacuanha, the effects of which do not depend solely on their aperient and emetic qualities. The drugs must be regarded as having a 'specific' effect, a fact which does not seem as yet to have been fully acknowledged, at least as far as German textbooks are concerned." Manson says he can offer no explanation of the action of any drug in dysentery, and admits that we use them empirically, but thinks that "ipecac. and sinaruba really seem to have some sort of specific action on the disease or its cause, but in what way it is impossible to say." Yeo thinks that ipecacuanha may be microbicidal and arrest the growth of the organism, whether amœba or bacillus, producing the disease, while Fayrer points out that the mortality of all varieties of dysentery in India, which was 11 per cent. before its use, fell to 5 per cent. after its introduction. The method of exhibiting the drug almost universally adopted in military practice in India, is to interdict food for three hours and then to give 20 minims of liquor opii sedativus in a small quantity of water. Half an hour after the opium 30 grains of powdered ipecacuanha are given in the form of freshly prepared pills or as a bolus. To prevent vomiting the patient is directed to lie perfectly still in a darkened room and not to drink, speak or move for three or four hours. He must be cautioned not to swallow his saliva, and a nurse should remain by his side with directions to wipe away any salivary secretion on the slightest indication from the patient.

Ipecacuanha prepared without the emetic principle was much vaunted at one time, but its use was abandoned by most Indian practitioners before the South African war, when it was extensively used and found most unsatisfactory. I believe Day's remarkable experience of the failure of the drug to cure dysentery was due to his using this preparation. He reported sixty cases, in twenty-six of which he used ipecacuanha *sine emetina* and opium, with the result that nine died, and thirty-two in which he administered sulphate of magnesium with only one death.

The Lavage Treatment.—Osler says "that the treatment of dysentery by topical applications is by far the most rational plan," but I think this statement requires qualification. It is unquestionably a valuable method of treatment, but it is only applicable in sub-acute and chronic cases, at least in the tropics, where the services of skilled nurses are comparatively rarely obtainable. I merely refer to this method for the sake of completeness, as the results of the two previous lines of treatment are so good. For instance, Buchanan has treated 855 consecutive cases by salines, with only nine deaths, giving a case mortality of only 1.05, and these, I think, are almost as good results as can be hoped for in the treatment of an acute illness.

The fourth indication is to counteract any morbid condition of the blood. This is a most important indication, and one which has recently attracted much attention. Where dysentery occurs in a malarial subject quinine must be exhibited in full doses, and Maclean goes so far as to recommend that 20 grains of quinine should always be administered before the ipecacuanha treatment is begun. The morbid condition of the blood which has recently been shown to be frequently associated with dysentery, especially on the Indian frontier, is, however, diminished alkalinity, which Wright has shown to be a frequent cause of scurvy. It must, therefore, be borne in mind that a condition resembling ordinary dysentery may be simply a variety of scurvy, and it may be well, therefore, to test the alkalinity of the blood by the method advised by Wright in all cases of dysentery in which the origin is obscure. Recently in Somaliland a succession of cases of dysentery were found to be due to "acid intoxication," and were relieved by anti-scorbutic treatment.

The fifth and last indication is to maintain the patient's strength. This must be done by suitable diet, as indicated under our second heading, and the administration of stimulants in some cases, but not as a matter of routine. Few will agree with Yeo's suggestion that port and burgundy may be used in acute cases, and the custom of most physicians in the tropics is to prescribe brandy or champagne in the comparatively rare cases in which alcohol is necessary. "Ether and caffeine hypodermically and saline injections have been employed with success in cases in which life appeared to be endangered by hæmorrhage and anæmia with prostration and collapse." Sparteine has also been used with success. After the very acute stage is over, and when the appetite is returning, the strength must be supported by a fairly liberal diet. Egg-and-milk flavoured with nutmeg is an agreeable and nutritious food. Pounded sweetbread, chicken or mutton may be given, with strong

soups, and the many varieties of bland farinaceous food of which rice and bread are the types.

The Treatment of Chronic Dysentery.—We now turn to the treatment of chronic dysentery, a condition all too familiar to physicians who have practised in the East. The indications requiring treatment are here merely three in number: (1) to promote a restoration of the diseased mucous membrane; (2) to counteract any morbid tendency in the blood; and (3) to support the patient's strength by proper diet.

(1) Manson's routine in treating all cases of chronic dysentery, a method of which I have had some personal experience, is to give a short preliminary course of ipecacuanha—30, 25, 20, 15, 10, and 5 grains on successive evenings, with rest in bed and milk diet. He then proceeds to give a short course of very small doses of castor oil, with or without opium, three times daily, regulating the dose according to the amount of action produced. If this treatment does good he proceeds to give a mixture of simaruba and cinnamon, with or without some intestinal antiseptic, such as salol or B-naphthol. These measures failing, he has to resort to direct topical applications. Osler and Manson are agreed that these are of the utmost value in the treatment of dysentery, but on one important point the two great authorities differ. The latter insists that topical remedies should never be applied when acute symptoms are present, whereas the former gives the technique for their use in the acute stage of the disease. Nitrate of silver injections are now considered by most authorities to be the best form of local application in chronic dysentery, but solutions of quinine are strongly advocated by Osler in amœbic dysentery, this being with one exception the sole instance in which a remedy peculiar to one type of dysentery is advocated by any of the authors I have consulted.

Recent Bacteriological Investigations.—For the purpose of this paper I obtained the following strains of *B. dysenteriae*—(1) Shiga's bacillus, I.; (2) Shiga's bacillus, II.; (3) Flexner's bacillus; (4) Vaillard's bacillus; (5) Kruse's bacillus; and (6) *B. dysenteriae* (non-pathogenic). For the first of these cultures I am indebted to Captain Harvey, assistant professor of pathology, and for the remaining five to Major Fowler, assistant professor of hygiene at the Royal Army Medical College, London. To economise space I have arranged the morphological and cultural characteristics of the various bacilli in the accompanying table, which shows clearly their resemblance to, and difference from, the other members of the coli group of micro-organisms.

Conclusions.—(1) I think that we may take it as bacteriologically proven that notwithstanding slight cultural differences the various strains of bacillus dysenteriae isolated by Shiga, Flexner, Vaillard, Harris, and Firth are simply varieties of the same organism. Bruce's "G Bacillus" resembles them, but I have not included it in my limited observations, as it was isolated from a single case, and when it arrived in England it was almost dead and had to be revived by prolonged recultivation. In addition to these pathogenic strains of the organism there are several varieties of so-called pseudo-dysentery bacillus which are non-pathogenic and are to be distinguished from the true bacteria of

TABLE SHOWING THE MORPHOLOGICAL AND CULTURAL CHARACTERISTICS OF *BACILLUS DYSENTERIÆ* AND THE ALLIED GROUP OF MICRO-ORGANISMS.*

Micro-organism	Character	Motility	Flagella	Growth on nutrient agar	Gelatin stab	Peptone and salt	Neutral red shake	Litmus milk	Sterile potato	Agglutination with dysenteric serum.
Shiga's <i>B. dysenteriae</i> I.	Short rod with rounded ends. No spores. Length 1-3 μ	Motile in recent cultures from stools. Gradually loses motility in sub-cultures.	2-6. Mostly terminal. Rather short and thick.	Semi opaque. Resemble the growth of <i>B. typhosus</i> , but are more transparent	Similar to <i>B. typhosus</i> , but film which spreads out from puncture usually absent	Faint haziness which rapidly clears. No indol	No appreciable discharge of colour	Becomes feebly acid. After 4 days' incubation acidity has been estimated as equal to 6 per cent. decinormal alkaline solution. No clot	Transparent or whitish growth, which becomes brownish red or dirty grey, with discoloration of potato at edge in a few days	Usually only agglutinates with serum from animal immunised by special strain of <i>B. dysenteriae</i>
Shiga's bacillus II.	ditto	ditto	ditto	Has a characteristic odour called by the Germans "Spermeruch"	Growth not seen till 48 hours, and then only slight white growth	ditto	ditto	ditto	ditto	ditto
Vaillard's bacillus	Shorter than Shiga's, otherwise similar	ditto	Numerous fine, reticulated, very long and readily seen (Birt).	ditto	ditto	ditto	ditto	ditto	ditto	ditto
Flexner's bacillus	Similar to Shiga	ditto	Long, thick, and terminal	ditto	ditto	ditto	ditto	ditto	ditto	ditto
Kruse's bacillus	ditto	ditto	Usually 2 terminal	ditto	ditto	ditto	ditto	ditto	ditto	ditto
Pseudo-dysenteric bacillus	Generally somewhat larger than true dysentery bacillus	ditto	Variable	ditto	ditto	ditto	ditto	Slightly acid at first. Afterwards slightly alkaline	ditto	Very variable
<i>B. typhosus abdominalis</i>	Longer than either <i>B. dysenteriae</i> or <i>B. coli</i> . "Oval ends" (Muir and Ritchie).	Sub-cultures always very motile.	8-12	More opaque than those of <i>B. dysenteriae</i>	Similar, but surface film usually present.	ditto	ditto	Slight acidity after some days	For several days apparently no growth. Later slight pellicle with velvety surface.	Nil
Paratyphoid bacilli	ditto	Not so motile as <i>B. typhosus</i> but more so than <i>B. coli</i>	Variable	ditto	ditto	ditto	A, usually no change. B, sometimes fluorescence	Paratyphoid A produced acid like <i>B. typhosus</i> , and Paratyphoid B produced alkali	Variable	Nil
<i>B. coli communis</i>	Shorter and thicker than <i>B. typhosus</i>	Motility is 2-6 not so marked as <i>B. typhosus</i>	2-6	More opaque than <i>B. typhosus</i> .	Whiter, thicker, more opaque, and showing gas bubbles	Indol production marked	Canary yellow colour produced and gas bubbles	Marked acid and clot	In 48 hours distinct brownish film which rapidly spreads and becomes thicker	Nil

* In addition to the culture media and other tests shown in the table the effects of Gram's stain, bile salt broth, mannite nutrose broth, raffinose nutrose medium, salicine nutrose medium, caffeine medium, and agglutination with enteric fever serum were also tried. The effects were as follows. *Gram's stain*: "decolourised" with all nine bacilli. *Bile salt broth*: "acid, no gas" for the first eight bacilli; "acid and gas" for the *B. coli communis*. *Mannite nutrose broth*: "unchanged" for the first five bacilli; "growth and acid" for the pseudo-dysenteric bacillus; "acid" for the last three bacilli. *Raffinose nutrose medium* and also *salicine nutrose medium*: "acid and growth" for the pseudo-dysenteric bacillus; "unchanged" for the other eight bacilli. *Caffeine medium*: "growth" with the *B. typhosus abdominalis* and the Paratyphoid bacilli; "no growth" with the other seven bacilli. On testing with enteric fever serum the agglutination result was "marked" with the *B. typhosus abdominalis* and "nil" with the other eight bacilli.

dysentery by the fact that they act on carbohydrates unaffected by Shiga's and the other pathogenic bacilli and they fail to produce enteritis in animals. Whether, however, these bacilli represent degraded or transitional forms of the true bacillus it is, as yet, impossible to say. (2) That symptoms and intestinal lesions identical with those found in man supervene after the subcutaneous inoculation of rabbits with the cultures of the various strains of *B. dysenteriae*. (3) That the dysentery organism have considerable vitality. They will live on clothing for at least three weeks and are said to maintain their virulence in damp soil for months. When spread on bread crumbs, or similar articles of food, they survive for about a week. (4) They are, however, very readily destroyed by heat or by weak solutions of perchloride of mercury or the higher phenols. (5) The specific agglutination reaction with the serum of persons suffering from acute dysentery can generally be obtained within two weeks following the onset of symptoms, but is often poorly marked. It is, however, of some value, and the blood of all patients suffering from a prolonged attack of diarrhoea should invariably be tested with several strains of the bacillus, and the stools subjected to a microscopical examination, as my chief desire in this paper is to call attention to the fact that the character of the stools alone is not to be considered as the test of the presence or absence of dysentery.

I think the most important lesson to be drawn from my investigation of the literature on this subject, and my very limited bacteriological work with the organisms of dysentery, is that the profession has only begun to realise its ignorance of a very great subject and that the clinical entities, which we have hitherto styled dysentery, are not one disease but a group of maladies of very varying degrees of severity, ranging from the acute dysentery so familiar to those of us who have served in India or South Africa, to the simple infective diarrhoea which occurs in infants and adults. Simple diarrhoea may be, and often is, an abortive form of dysentery, as has been shown by the work of Dopter and Jurgens during the early part of 1905. During an epidemic of dysentery there are always a number of cases which are in reality dysentery, but because no blood appears in the stools are regarded as simple diarrhoea, and it is these cases which constitute a grave source of danger to the community, as they may infect others and give rise to attacks of true dysentery. Jurgens has recently examined the stools of twenty-five cases of simple diarrhoea which occurred during an epidemic of dysentery in a camp at Gruppe. He failed to recover the *B. dysenteriae*, but the serum of one of the cases agglutinated with a strain of the organism. Dopter examined bacteriologically the stools of eleven cases of diarrhoea occurring during an epidemic of dysentery last spring. Seven of these cases were very mild; the *B. dysenteriae* was, however, recovered from one of them, but the serum reaction in all of them was negative. The remaining four cases did not yield to ordinary treatment and ran a prolonged course, but only symptoms of diarrhoea were observed and no blood appeared in the stools. In one of these cases the *B. dysenteriae* was isolated, but in all the serum reaction was positive.

In the light of this recent work I submit that all

cases of diarrhoea occurring in the tropics should be treated with the same precautions as if they were manifest cases of dysentery, and in hospital should invariably be isolated and their stools sterilised in some simple form of steriliser, or by means of disinfectants. In the Indian hills all faecal matter should be received on pine needles, and burnt as suggested by me in a communication to the *Journal of the Royal Army Medical Corps*, entitled "The Goux System and its Application to India" (vol. vi., p. 662). If acute diarrhoea and dysentery were recognised in the service as infectious diseases, promptly isolated, and careful disinfection of clothing, bedding, and stools carried out, I believe we should hear less of epidemics of dysentery both in tropical countries and on active service. The Japanese have shown us a good example in the recent war, as they fully recognised dysentery as a communicable disease with, we are told, the happiest results. In conclusion, I maintain that if we can in future warfare secure for His Majesty's troops a pure, or at least, an innocuous, water-supply, an intelligent conservancy, and the prompt recognition and isolation of suspicious cases of diarrhoea, we can confidently hope for comparative immunity from the fell disease, or rather diseases, which have been the scourge of all armies in the field since the day of Agincourt.

Reviews.

A JAPANESE TEXT-BOOK ON PLAGUE. By Dr. Tohiu Ishigami, Superintendent Bacteriological Institute, Osaka, Japan; formerly Assistant Bacteriologist to Professor Kitasato. Revised by Professor Shibasaburo Kitasato, Tokyo, Japan. Translated, enlarged and illustrated with Pathogenic Horticulture by Donald MacDonald, M.B., C.M. (Glasg.), late Consulting Bacteriologist to the S. Australian Government. 152 illustrations. 3 plates. (Adelaide: Vardon and Pritchard, Gresham Street, 1905).

PART I.

This text-book is written by one who has closely studied plague in all its bearings. Dr. Ishigami was a member of the Japanese Commission which visited Hong Kong when plague appeared there in 1894 under the leadership of Professors Kitasato and Aoyama. His training in the clinical and bacteriological features of plague was thorough, and he has given us a text-book which is characterised throughout by judical statements, accurate details and many suggestions of an eminently scientific nature as to the means by which the plague is spread. The prophylaxis of the disease is dealt with in a manner which must commend itself to everyone who has studied plague. One of the most interesting parts of the book is that relating to the plague bacillus itself. The question of involution forms of the bacillus, whereby much confusion has arisen in the matter of diagnosis, is clearly stated by Dr. Ishigami. It so often occurs that bacteriologists hesitate to pronounce the disease to be plague, because they meet only with involution forms, that a careful perusal of the paragraphs dealing

with the matter should prove instructive and convincing. At pages 6 and 7 we find: On the first day Professor Kitasato examined the blood of the heart, spleen, liver, lungs, and swollen lymphatic glands of a corpse dead from plague. He found in them a considerable number of strangely original rod-shaped bacilli. On the same day microscopic examinations of the blood obtained from the finger tips of a critical patient revealed the existence in it of similar bacilli.

Subsequent bacteriological examinations of several patients and corpses demonstrated the presence of the same bacillus in every case. But those existing in the blood were regular in shape and smaller, whilst those in buboes or swollen glands and other organs were irregular in shape, and somewhat larger. Both were found to exhibit bipolar staining, the middle part refusing to retain the dye. The cultures made from both varieties were similar in the shape and appearance of their growth. Therefore, Professor Kitasato was of the opinion that those which existed in the glands and other organs were pleomorphic involution forms, and, following a fundamental principle of pathology, attached greater importance to those existing in the blood. Hence he conducted a series of cultivations and experiments on animals, the results of which were made public as explaining the cause of the disease.

A few days after this discovery of Professor Kitasato's, Dr. Yersin, of France, sent out from the Pasteur Institute, arrived at Hong Kong *via* Saigon. Conducting his investigations independently of Professor Kitasato, he studied the bacilli chiefly as met with in the glands and organs, which we had considered to be involution forms.

He reported the results of his investigations to the Pasteur Institute as the cause of the disease. Since then, Professor Aoyama has made a special microscopic study of specimens of organs and glands from the plague corpses which have been brought from Hong Kong. He gave out as the result that the bacillus which exists in the glands, and which is decolourised by Gram's method, is an entirely different species to that which exists in the blood, and which is not decolourised by Gram's method.

PART II.

"Plague Pathogenic Horticulture" is contributed by Dr. MacDonald, to which is added a lecture on Plague and "Two Dozen Anti-Plague Golden Rules." The rules are as follows:—

- Remember, plague is more "Death" than disease.
- Never visit suspected or plague-stricken houses.
- Never alter a well-regulated diet.
- Wash the hands frequently.
- Avoid excesses in diet and wines.
- Cook food well and preserve from insects.
- Heat serving plates to a high temperature.
- Cooking utensils wash with boiled water or water of undoubted purity.
- Rather drink weak tea than suspicious water.
- Avoid excess in exercise and bathing.
- Never handle dead rats.
- Destroy your vermin.
- Never neglect a trifling wound, cold, or dyspepsia.
- Protect the lower limbs well.

- Be vaccinated and re-vaccinated if you can.
- Keep good fires in winter.
- Avoid wet feet.
- Preserve the head with sunshades in summer.
- Use if you can the mosquito net.
- Never exchange pipes.
- Never kiss the plague suspect.
- Avoid plague apparel unless fumigated.
- Never fear, rather be cool, calm, and collected.
- Remember cleanliness is next to godliness.
- The text-book is fully illustrated and is a valuable addition to plague literature.

Personal Notes.

INDIAN MEDICAL SERVICES.

Arrivals Reported in London.—Lieutenant-Colonel J. Smyth, Major V. C. Drake Brockman, Major J. A. Hamilton, Captain J. H. Horton, Captain J. L. Robertson, Captain H. Ainsworth.

Extensions of Leave.—Lieutenant-Colonel R. J. Baker, study leave, from April 23rd to June 23rd, 1906, and October 8th to November 8th, 1906; Major T. W. A. Fullerton, furlough to July 1st, 1907; Major C. E. L. Gilbert, three month's furlough; Captain D. S. Baker, one month's furlough.

Permitted to Return to Duty.—Lieutenant-Colonel W. B. Browning.

Postings.

Captain M. Mackelvie and Captain F. P. Connor, services placed at disposal of Government of Bengal.

Lieutenant-Colonel H. Hendly is appointed Civil Surgeon, Kurnal.

Lieutenant F. J. Baley, I.S.M.D., officiates as Civil Surgeon, Singh Bhum.

Military Assistant Surgeon F. G. Cutler, I.S.M.D., is appointed Assistant to the Civil Surgeon, Jubbulpore and Nupt.

Assistant Surgeon J. Robertson, I.S.M.D., officiates as Civil Surgeon, Yeoltmal.

Captain F. T. Thompson, to the Medical Charge 11th Lancers.

Lieutenant Colonel J. Morwood, to be Civil Surgeon, Sultanpur.

Dr. E. J. Simpson, uncovenanted Medical Service, to be Civil Surgeon, Jalaim.

Assistant Surgeon E. Phillips, I.S.M.D., to officiate as Civil Surgeon, Hoshiarpur.

Lieutenant Colonel A. Coates, resumes charge of the duties of Professor of Midwifery and Forensic Medicine, Medical College, Lahore, and Medical Officer in charge of Government College.

Leave.

Major D. T. Lane, private and study leave 12 m.

LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

YELLOW FEVER EXPEDITION.

THE members of the Yellow Fever Expedition from Liverpool, which commenced research work on yellow fever in Brazil in 1905, still continue their investigations. It is satisfactory to know that the medical members of the expedition who were attacked by yellow fever have quite recovered from their illness. A telegram was recently received in Liverpool to the effect that the expedition had succeeded in proving that the chimpanzee can be infected with yellow fever by means of infected *Stegomyia* mosquito. This discovery is likely to prove important from a scientific and practical point of view.

New Instruments.

THE Lawrence patent portable water steriliser for travellers in the Tropics.

We have seen this apparatus at work, and can commend it as both efficient and portable. The price, some £5, places the four gallon per hour steriliser within the reach of all travellers in tropical countries.

Notes and News.

COMMENTING on the first report of the bacteriologists who have been studying the etiology of plague, the *Times of India* says: "The conclusions which these facts force home with remorseless logic is that even with our increased scientific knowledge we cannot secure absolute results against plague, with ordinary sanitary measures. We can reduce the virulence of the seasonal epidemics by rat and flea destruction; we can prepare particular localities to resist the disease through the warning which is now conveyed by the epidemic amongst rats; we can reduce the media of infection by the use of insecticides wherever dead rats are found; we can protect a section of the population by making their dwellings rat-proof; we can raise the resisting power of the people and increase the facilities for sanitary work by improving the conditions amongst which the poor live. But none of these measures, or all of them combined, no matter how vigorously and ably they may be prosecuted, even promise absolute results in the conditions of life of a great Indian city, unless they are combined with the practice of inoculation. It is as true to-day as it was before the Plague Commission set to work that there are only two certain methods of combating plague—to run away from it or to protect one's self against it."

With this somewhat despondent verdict of our lay contemporaries we can, however, by no means agree, as Australian experience has shown that rat destruction, properly carried out, may be trusted as a sufficient measure of protection, and though native prejudices may in certain localities place obstacles in the way of the successful operation of the plan, we believe that these difficulties are by no means insuperable, provided that due tact and consideration be exercised in meeting them.

ONE of the Nobel prizes for 1906 has been divided between Professor C. Golgi, of Pavia, and Professor Ramon y Cajal, of Madrid.

ANKYLOSTOMIASIS has been declared to exist in Virginia, United States of America.

THE University of Sydney has established a diploma in Public Health.

MEDICAL supervision of the Mecca pilgrims is being devised on an elaborate scale.

There has been an outbreak of plague at Djeddah,

the disembarkation port for Mecca in the Red Sea, and a strict quarantine and medical inspection is being prepared before the pilgrims are allowed to leave Djeddah for Mecca. Half way to Mecca, and again at Mecca itself, the pilgrims are to be medically inspected. An isolation hospital has been established at Mecca.

YELLOW FEVER IN CUBA.—Owing to the relaxation of hygienic measures in Havana, there is evidence that yellow fever is again increasing in the island of Cuba. Under the directing hand of Dr. Gorgas, yellow fever was extinguished in Cuba, but under the *régime* of the Cubans since they were granted self-government, the island, from a hygienic standpoint, is rapidly falling back into the pestilential state which had existed there until the United States Government assumed control.

DURING 1905 the deaths due to wild animals in India were as follows:—Snakes caused 21,797 deaths; elephants, 48; leopards, 401; tigers, 786; wolves, 153. Cattle were destroyed by wild animals to the number of 92,277. No fewer than 16,915 wild animals were killed.

THE mortality of children born in Calcutta during 1905 amounted to 310 in every 1,000.

RATS AND PLAGUE.—The Medical Officer of Health for the City of Madras believes that the freedom of Madras from plague is due to the fact that there are few brown rats infesting the sewers of the city. Were their numbers greater, the disease would in all probability have spread extensively.

MOSQUITO DESTRUCTION.—The introduction of a little silvery fish, named in the Punjab the "Chilwa," and in the Deccan and South India the "Roopha," into pools infested with mosquito larvæ, has proved an efficient means of destroying mosquito life. This fish—the *Cheela argentea*—is found all over India, and would seem an excellent larvicide. Quicklime thrown in stagnant pools has also been used with good effect in the destruction of these pests.

COUNCIL OF MEDICAL INSTRUCTION FOR TURKEY.—UNDER the title of the "Conseil d'Instruction Médicale," a new medical council has been instituted in Constantinople. The duty of this body is to control the medical and sanitary departments of the Ottoman Empire. Professor Mazhar Bey is the president of the Council.

MOSQUITOES AND MALARIA.—At a special meeting of the Bangalore municipal commissioners to consider what steps should be taken to repress malaria, Captain Standage, I.M.S., Residency Surgeon, addressed them on the subject of the connection of the mosquito with malaria. The work done by the Health Department in using kerosine oil on tank borders and ponds justifies the hope that the problem of decreasing malaria is not beyond the capacity of the municipality. He therefore proposed that a pamphlet which he had drawn up on the scheme be printed in several languages and circulated broadcast. This contains a

popular exposition of the mosquito theory, and there are hopes that the people will take kindly to the destruction of mosquitoes. To popularise the theory an experimental school of instruction is to be opened here on December 1st, and will last for four months. It will be open to six officers and non-commissioned officers each from the Poona and Secunderabad Divisions.—*Pioneer Mail*, November 23rd, 1906.

ONE might wish, however, that, in place of being left to the initiative and enthusiasm of individual officers, anti-malarial sanitation should be adopted and enforced as a universal sanitary policy by the Government of India. The ravages caused by malaria in the cantonments of the Punjab, however, show that this is far from being the case, and this mail's news from Delhi speaks of the disease as raging there in a fashion it certainly could not do if proper steps were taken to limit the mischief. Surely the experience of Havana and Panama, to say nothing of older successes, should suffice to convince the "Little tin gods on wheels" that anti-malaria sanitation is something more than a "doctor's fad."

Recent and Current Literature.

A tabulated list of recent publications and articles bearing on tropical diseases is given below. To readers interested in any branch of tropical literature mentioned in these lists the Editors of the JOURNAL OF TROPICAL MEDICINE AND HYGIENE will be pleased, when possible, to send, on application, the medical journals in which the articles appear.

"Australian Medical Gazette," October 20, 1906.

I. POLYCYTHÆMIA AND CHRONIC CYANOSIS WITHOUT SPLENIC ENLARGEMENT.

Reissman, C., contributes an interesting article on this subject. A girl, aged 18, became gradually cyanosed. The liver increased in size as the cyanosis became more chronic. A more or less acute illness, preceded by attacks of unconsciousness, followed by vomiting, diarrhoea, headaches, giddiness, drowsiness, signs of venous obstruction in the chest and leg, hæmoptysis, an increased number of red cells in the blood, increased excretion of chromogen in the urine, and increased coagulability of the blood. Liver abscess was at first suspected, but search for pus in the liver proved negative. A mediastinal tumour suggested itself, but the subsequent history cancelled this belief; the absence of leucocytosis negatived an inflammatory origin. The patient recovered, and the assumption that the venous obstruction was due to thrombosis seems to be rational, especially in view of the fact that of the recorded cases, *post-mortem* evidence seems to point to thrombosis and thrombotic softening. The explanation given by Osler in cases of the kind is that there is increased viscosity of the blood depending upon numerical increase of the red cells.

This disease is in many respects analogous to myelogenic leukaemia, the bone-marrow in one case affording an excess of white cells, but in polycythæmia the red cells are in excess.

Reissman suggests the X-ray treatment for polycythæmia, basing his opinion upon the benefits derived in myelogenic leukaemia for this agent.

II. PAROTITIS DURING DYSENTERY.

Bollen, P., met with a case of parotitis in a child aged 4½, during an attack of dysentery. The child fell ill on May 13th, 1906, and the dysenteric attack ran a typical course. On May 25th a swelling over the right parotid region was

observed, which subsequently increased, but by June 3rd had wholly disappeared. There was not suppuration in the parotid, but pain with earache and difficulty in movement of the jaw. The pus in the stools and the swelling in the parotid subsided simultaneously. Parotitis is occasionally mentioned as occurring in dysentery, but the ailment is usually part of a general pyæmic condition and ends in suppuration.

"Treatment," November, 1906.

THE TREATMENT OF TAPEWORM.

Jubb, G., advises for tapeworm treatment rest in bed for two days, a dose of castor oil on going to bed, a milk diet for two days, on evening of second day in bed a second dose of castor oil. On the morning of the third day, while fasting, a capsule containing 15 minims of extract of male fern is given every fifteen minutes till six capsules have been taken. One hour after the last capsule, a tablespoonful of castor oil. After the oil has acted the patient to resume ordinary diet. Jubb finds that male fern exhibited as recommended is equally efficient for *Tania mediocanellata* or for *T. solium*. The head is best sought for by causing the stool to be dropped in water and searched for in a shallow porcelain tray.

"Medical Record," August 4, 1906.

SPLENIC EXTRACT IN THE TREATMENT OF MALARIA.

Carpenter recommends the fresh extract of spleen in 5 grain doses every four hours. In quartan and æstivo-autumnal types a hæmatinic is usually required in addition, but in the acute tertian and quotidian types the splenic extract alone is sufficient.

"Semaine Medicale," September 26, 1906.

Zanardini, G., advocates the use of creasote enemata in dysentery, made as follows: 1 drachm of a 10 per cent. solution of creasote is added to the yolk of one egg and made into an emulsion with a litre of water.

Billet has also used creasote in the form of one-quarter to one-half litre of an emulsion made by a 1 or 2 per cent. solution of creasote in almond oil. These enemata are administered twice daily for as long as symptoms continue.

"La Clinique," May 18, 1906.

THE TREATMENT OF LEPROSY.

Unna considers chaulmoogra oil the nearest approach to a specific remedy for leprosy we possess. The drug can be given by the mouth or by the rectum, but should not be administered hypodermically, owing to the pain it causes. In order to overcome the difficulties of local medication from thickening of the tissues and the obstruction of the lymphatics by the lepra bacillus, Unna recommends the application of local heat and massage. The parts may be covered with flannel and ironed, or baths of "ink" at a temperature of 86° F., combined with massage. The applications serve to dislodge the bacilli and render them more liable to destruction by ointments containing ichthyol, chrysarobin, pyrogallol, or other bactericides. The ink bath consists of a solution of sulphate of iron and tannin.

Notices to Correspondents.

- 1.—Manuscripts sent in cannot be returned.
- 2.—As our contributors are for the most part resident abroad, proofs will not be submitted to those dwelling outside the United Kingdom, unless specially desired and arranged for.
- 3.—To ensure accuracy in printing it is specially requested that all communications should be written clearly.
- 4.—Authors desiring reprints of their communications to the JOURNAL OF TROPICAL MEDICINE AND HYGIENE should communicate with the Publishers.
- 5.—Correspondents should look for replies under the heading "Answers to Correspondents."

THE
Journal of Tropical Medicine

SELECTIONS

FROM
COLONIAL MEDICAL REPORTS.

1906.

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Colonial Medical Reports.—No. 16.—Trinidad (*continued*).

RETURN OF INFANTILE MORTALITY FOR THE YEAR 1904-1905.

Diseases	AGE PERIODS					Total
	Under 1 month	1 to 3 months	3 to 6 months	6 to 9 months	9 to 12 months	
Diarrhœa	26	43	44	28	16	157
Lung Diseases	7	10	16	8	4	45
Premature Birth	36	1	..	..	..	37
Debility	33	8	6	1	1	49
Tetanus Neonatorum	30	..	..	..	..	30
Dentition .. .. .	..	..	..	6	7	15
Malnutrition	6	7	5	4	3	25
Tuberculosis .. .. .	..	3	4	10	2	19
Influenza .. .. .	..	..	1	..	..	1
Typhoid Fever	1	1	4	2	1	9
Whooping Cough	1	..	1	1	..	3
Congenital Syphilis .. .. .	..	4	10	..	1	15
Marasmus	1	5	3	1	1	11
Infantile Convulsions	4	1	5	9	..	19
Malarial Fever .. .. .	..	1	2	4	1	8
Monstrosity	1	..	..	..	..	1
Hydrocephalus	1	..	..	1	..	2
Hæmorrhage from Umbilicus	12	..	..	..	..	12
Obstruction of Bowels	1	..	..	..	..	1
Meningitis .. .. .	..	1	3	1	1	6
Peritonitis	1	2	..	..	..	3
Asphyxia	1	..	..	..	1	2
Congenital Lung Disease	2	1	..	..	..	3
" Heart	2	..	..	..	..	2
" Liver	3	1	..	1	..	5
Anæmia .. .. .	..	..	..	1	..	1
	169	89	106	78	39	481

RETURN OF DISEASES AND DEATHS IN 1904, AT THE
Colonial Hospital, San Fernando Hospital, District and Yaws Hospitals.

GENERAL DISEASES.				GENERAL DISEASES—continued.			
	Admis- sions.	Deaths.	Total Cases Treated.		Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism	26	1	26	Other Tubercular Diseases	—	—	—
Anæmia	600	90	626	Varicella	—	—	—
Anthrax	—	—	—	Whooping Cough	4	—	4
Beri-beri	—	—	—	Yaws	829	3	1,183
Bilharziosis	—	—	—	Yellow Fever	—	—	—
Blackwater Fever	—	—	—				
Chicken-pox	73	—	77				
Cholera	—	—	—				
Choleraic Diarrhœa	—	—	—				
Congenital Malformation	9	—	9				
Debility	303	52	308				
Delirium Tremens	1	—	1				
Dengue	—	—	—				
Diabetes Mellitus	14	4	14				
Diabetes Insipidus	—	—	—				
Diphtheria	3	—	3				
Dysentery	—	—	—				
Enteric Fever	60	26	65				
Erysipelas	12	3	12				
Febricula	—	—	—				
Filariasis	—	—	—				
Gonorrhœa	241	—	247				
Gout	—	—	—				
Hydrophobia	1	1	1				
Influenza	37	1	37				
Kala-Azar	—	—	—				
Leprosy	14	3	14				
(a) Nodular	—	—	—				
(b) Anæsthetic	25	1	25				
(c) Mixed	—	—	—				
Malarial Fever—							
(a) Intermittent—							
Quotidian	—	—	—				
Tertian	1,004	3	1,026				
Quartan	—	—	—				
Irregular	3	—	3				
Type undiagnosed	—	—	—				
(b) Remittent	125	26	127				
(c) Pernicious	27	23	28				
(d) Malarial Cachexia	84	6	87				
Malta Fever	—	—	—				
Measles	1	—	1				
Mumps	—	—	—				
New Growths—							
Non-malignant	19	—	21				
Malignant	—	—	—				
Old Age	155	55	181				
Other Diseases	64	39	65				
Pellagra	—	—	—				
Plague	—	—	—				
Pyæmia	3	2	3				
Rachitis	—	—	—				
Rheumatic Fever	—	—	—				
Rheumatism	211	1	232				
Rheumatoid Arthritis	7	—	7				
Scarlet Fever	—	—	—				
Scurvy	1	—	1				
Septicæmia	6	6	6				
Sleeping Sickness	—	—	—				
Sloughing Phagedæna	—	—	—				
Small-pox	—	—	—				
Syphilis—							
(a) Primary	33	—	33				
(b) Secondary	60	—	61				
(c) Tertiary	76	3	83				
(d) Congenital	27	12	28				
Tetanus	—	—	—				
Trypanosoma Fever	—	—	—				
Tubercle—							
(a) Phthisis Pulmonalis	332	157	355				
(b) Tuberculosis of Glands	—	—	—				
(c) Lupus	—	—	—				
(d) Tabes Mesenterica	3	5	3				
(e) Tuberculous Disease of Bones	—	—	—				

LOCAL DISEASES.

Diseases of the—			
Cellular Tissue	256	6	265
Circulatory System—			
(a) Valvular Disease of Heart	147	38	161
(b) Other Diseases	54	24	55
Digestive System—			
(a) Diarrhœa	306	121	327
(b) Hill Diarrhœa	—	—	—
(c) Hepatitis	6	—	6
Congestion of Liver	10	—	10
(d) Abscess of Liver	4	5	4
(e) Tropical Liver	17	3	17
(f) Jaundice, Catarrhal	—	—	—
(g) Cirrhosis of Liver	—	—	—
(h) Acute Yellow Atrophy	2	2	2
(i) Sprue	—	—	—
(j) Other Diseases	1,025	132	1,054
Ear	23	1	24
Eye	312	—	335
Generative System—			
Male Organs	465	8	452
Female Organs	1,007	43	1,033
Lymphatic System	140	59	155
Nervous System	520	104	534
Nose	30	1	32
Organs of Locomotion	171	3	185
Respiratory System	623	120	658
Skin—			
(a) Scabies	—	—	—
(b) Ringworm	—	—	—
(c) Tinea Imbricata	—	—	—
(d) Favus	—	—	—
(e) Eczema	—	—	—
(f) Other Diseases	1,020	12	1,164
Urinary System	453	135	466
Injuries, General, Local—			
(a) Siriasis (Heatstroke)	—	—	—
(b) Sunstroke (Heat Prostration)	1	—	1
(c) Other Injuries	912	28	952
Parasites—			
Ascaris lumbricoides	38	3	39
Oxyuris vermicularis	1	—	1
Doelhmus duodenalis, or Ankylos- toma duodenale	210	29	216
Dracunculus medinensis (Guinea- worm)	1	—	1
Tape-worm	—	—	—
Poisons—			
Snake-bites	6	1	6
Corrosive Acids	—	—	—
Metallic Poisons	2	—	2
Vegetable Alkaloids	24	3	24
Nature Unknown	—	—	—
Other Poisons	28	—	28
Surgical Operations—			
Amputations, Major	—	—	—
" Minor	—	—	—
Other Operations	—	—	—
Eye			
(a) Cataract	—	—	—
(b) Iridectomy	—	—	—
(c) Other Eye Operations	—	—	—

Colonial Medical Reports.—No. 17.—BASUTOLAND.**Medical Report for the Year ending December 31st, 1904.****By EDWARD CHARLES LONG, M.R.C.S., L.R.C.P.***Principal Medical Officer.***POPULATION.**

THE census taken in 1904 shows a remarkable increase in the population. In thirteen years, the native population has increased 60 per cent. The number of Europeans, which of course bears an insignificant proportion to the total population, now amounts to 895, as against 578 in 1898.

Of the natives 163,216 are males and 184,515 females. The only age test applied in the census was an under and over fifteen years age limit: 174,043 were under 15 years, and 173,688 over 15 years of age.

There is a good deal of local overcrowding, an evil which, I think, is increasing and unnecessary, seeing that the population works out at 34 per square mile. The natives are housed in huts which are usually placed very close together, forming small villages. The huts are, as a rule, unventilated and very little air circulates between the huts. The ground around them is fouled with all sorts of refuse, excreta, &c. These customs undoubtedly have an unfavourable influence on the health of the community, and coupled with the more general use of European clothing, are partly responsible for the marked increase in tubercular disease, to which subsequent reference will be made.

As there is no registration of births and deaths, no trustworthy information is available concerning the birth and death-rate. The mortality amongst young children is high, and speaking from general impressions, I should say that the death-rate amongst young people generally, is higher than it used to be.

GENERAL HEALTH.

The year 1904 was an exceptionally healthy one. The number of patients treated at the dispensaries was less than the previous year, and there were no epidemics.

SMALL-POX.

No cases of small-pox were recorded during the year. This highly satisfactory state of affairs is undoubtedly due to the energy with which vaccination has been prosecuted during recent years. The

majority of the inhabitants have now been vaccinated, and a fair proportion re-vaccinated.

24,301 vaccinations, all with calf lymph, were performed during the year. The value of vaccination is now thoroughly appreciated by the natives. Instead of opposition, we now have frequent applications from chiefs and headmen for vaccinators to be sent to their districts.

ENTERIC FEVER.

Sporadic cases of typhoid have been recorded. The majority of the cases admitted into hospital were labourers who had contracted the disease in neighbouring territories.

TUBERCULOSIS.

I regret to have to record a noticeable increase of tubercular diseases throughout the territory. The increase is traceable to (1) tuberculosis contracted during residence at mining centres; (2) overcrowding in the villages, and insanitary surroundings and habits; (3) the general adoption of European clothing; (4) to direct infection.

A noticeable proportion of the men who have been engaged in underground work at the mines return suffering from miners' phthisis. This cause cannot, of course, be dealt with here. With a view to combating the other causes and instructing the natives in the elementary principles of sanitation and public health, a small pamphlet on the subject has been written, translated into Sesuto, for distribution throughout the native schools. If the reading of this little book is made compulsory in the schools, much good may be looked for by the people thus receiving some simple instruction during youth in those most important subjects, public health and sanitation.

The figures given in the nosological return do not, I think, represent the real number of tubercular cases in the country. Many cases returned as adenitis would, I feel sure, be found to be tubercular, if they could be followed up. Two cases of acute miliary tuberculosis came under my notice during the year, the diagnosis being confirmed by *post-mortem* examination.

SYPHILIS.

This disease is still an important factor in relation to the health of the nation. The returns show no diminution in the number of cases treated. The widespread prevalence of the disease is having an appreciable effect in lowering the physique of the people.

The identity of syphilis and so-called yaws has been fully discussed in a previous report. As some observers still regard yaws as a separate disease, I would again point out that the experience of medical officers in this country proves that every lesion delineated in Fasciculus XIV. of the New Sydenham Society's Atlas finds its counterpart in syphilitic natives in Basutoland.

NEW GROWTHS.

Benign growths are still frequently met with, and specimens of all growths are forwarded to the Cancer Research Fund. Malignant growths are extremely rare.

GOITRE.

This disease is never seen in the Basuto, but Fingos are very subject to it. It is fairly amenable to treatment by painting with iodine, and the internal administration of iodine of potassium and arsenic.

One case which ended fatally is worth recording. A female Fingo, aged 20 years, was admitted with a large bilateral goitre. It diminished slightly in size under treatment, but the patient, who was a fine healthy-looking young woman, was anxious to have it removed by operation. While waiting for operation, and being apparently in excellent health, the temperature suddenly rose one day to 106° F., accompanied by a very rapid pulse, muscular tremors, and cold sweats. In spite of all treatment, the symptoms persisted, and the patient died forty-eight hours after the first onset of the unfavourable symptoms. No *post-mortem* examination was obtainable.

RHEUMATISM.

This disease seems to be more prevalent in dry years. The subacute and chronic forms are the most common. Many acute cases probably escape observation from inability to attend at the dispensary. A considerable proportion of the more chronic cases would appear to be gonorrhœal in origin.

We find large doses of perchloride of iron, with saline purgatives, the most efficacious treatment.

DISEASES OF THE CIRCULATORY SYSTEM.

The increasing number of heart cases is traceable to the prevalence of rheumatism. Syphilis, as far as my observation goes, does not seem to affect the vascular system in natives. Most of the patients only seek advice when the disease is far advanced. Mitral stenosis and incompetence are the most common forms of valvular disease. One death occurred from pericarditis, in which the pericardium was universally adherent.

RESPIRATORY SYSTEM.

Catarrhal pharyngitis and bronchial catarrh were prevalent during the winter months. Pneumonia was less prevalent than during the previous year.

GENERATIVE SYSTEM.

The only cases calling for notice under this heading were one of hypertrophied prostate in a very old native; the prostate was enucleated by the suprapubic operation, and weighed 8½ oz. The other case was one of extrauterine foetation, which was successfully treated by laparotomy.

DISEASES OF THE NOSE.

A case of empyema of the frontal sinus, with necrosis of the anterior wall of the sinus, was treated by trephining the sinus, curetting and drainage.

DISEASES OF THE EYE.

The method of subconjunctival injections has been given a fair trial during the year, but the expectations of its value have not been realised.

METEOROLOGY.

This does not call for special notice. The year was again unusually dry, the rainfall being about 12 inches below the average. The crops were, however, saved, and a sufficient food supply assured to the inhabitants. The winter was long and exceptionally cold, but does not appear to have had any ill effect on the general health.

"(9) That one of these trypanosomes is probably identical with *Trypanosoma brucei*. The other two differ from it, and are, provisionally, unclassified.

"(10) That these varieties of trypanosomes are conveyed from the sick to the healthy by the Uganda tsetse-fly (*G. palpalis*), and not by other biting flies (*Stomoxys*)."

It appears that the lymphatic glands of every case of sleeping sickness are enlarged, and the juice taken by puncture during life contains many active trypanosomes, and also disintegrating-forms. In so-called "trypanosoma fever" the same conditions and findings obtain. It was also determined that lymphocytosis occurs in all cases of sleeping sickness. The cells met with in the cerebro-spinal fluid of the sleeping sickness cases taken during life by lumbar puncture are lymphocytes, and these are more numerous in the late stages of the disease. The presence of a diplo-streptococcus in various tissues and fluids, which for some time has excited discussion as to the part it plays in sleeping sickness, seems to have been proved to have no etiological significance; but is quite a late development in the disease when it does appear, which is not always the case. All the evidence goes to show that the trypanosoma derived from the blood of early cases of sleeping sickness, and those derived from the cerebro-spinal fluid of advanced cases of the disease are one and the same, namely, the *T. gambiense*.

The tsetse-fly, the *Glossina palpalis*, seems to be the medium of transmission; and this fly, when infected, can communicate the disease to monkeys as well as to men. Trypanosomes occur in animals such as oxen, ponies, camels, dogs and mules, in the area in which the Commission was at work; but it was impossible on morphological grounds alone to arrive at a final conclusion as to the identity or otherwise of the various "strains" met with in different animals, but there can be no doubt that the *T. gambiense* differs morphologically from the animal varieties. By inoculation experiments, however, there would appear to be a marked distinction in the behaviour of the several trypanosomes met with in animals.

Lieutenants A. C. H. Gray and F. M. G. Tulloch report several observations made on tsetse-flies. They proved that the *T. gambiense* multiplies in the alimentary canal of the *G. palpalis*, and that the trypanosomes undergo morphological change in the fly. Trypanosomes taken from the intestine of the fly did not infect monkeys, but the salivary glands of the fly were seen to be occupied by trypanosomes from the intestines of the fly.

Of noted lesions in sleeping sickness the only one which seems to have been recently added is a petechial hæmorrhage in the mucous membrane of the stomach.

As regards treatment, arsenic—as sodium arseniate, as Fowler's solution, or the combination of the former with trypanoth or atoxyl, seem the only drugs which have so far given even partially beneficial results.

MALARIA.

Of the several forms of prophylaxis, quinine, mosquito netting and destruction of mosquito breeding grounds, each has its advocates. The Italian Commission for the study of malaria found quinine most effective in preventing relapses of attacks of fever and in restoring the patients to health. The members of the Commission found 6 grains to adults daily, and 3 grains to children, were efficacious in preventing new infections and in preventing relapses of illness.

The objection to quinine taking is the difficulty of getting patients or persons exposed to malaria to continue using the drug, except under the strictest supervision. The same may be said of protection by mosquito netting; apathy on the part of the persons exposed to malaria is the great drawback to the complete success of mechanical protection from mosquitoes; but where supervision was possible, as in the case of the Corsican Anti-malarial League, mosquito netting proved highly, in fact completely, efficacious. Destruction of *Anopheles*' breeding grounds as a prophylactic agent did not find favour to any great extent in Italy, owing to the difficulty of draining the large swampy areas where mosquitoes breed. In several parts, however, this mode of exterminating malaria has given excellent results.

one of the best, perhaps, being that obtained at Klang and Port Swettenham, in the Malay States, by Dr. Malcolm Watson. In a district where eradication seemed at first sight well-nigh impossible, Dr. Watson practically exterminated malaria by systematic drainage of mosquito breeding places, and by clearing the immediate neighbourhood of shrubs and secondary jungle-growth. At Port Swettenham, during the years 1901-02-03-04, the first-mentioned year being previous to anti-malarial measures, the cases of malaria numbered 188, 70, 21 and 4.

In both Klang and Port Swettenham, malaria, as a fatal disease, was reduced to *nil*, and as a factor in illness wholly insignificant. Major Ross's work at Ismailia in the same direction gave, and continues to give, most encouraging results. In 1901, before anti-malarial measures were tried in Ismailia, there were 1,990 cases of malarial fever in the town; in 1903 and 1904 the fever cases fell to 214 and 90 respectively. It would seem, therefore, that by all methods of malaria prophylaxis—quinine taking, netting and drainage—malaria may be thwarted, and a combination of two or all of these methods affords proof that malaria is a preventible disease.

MALTA FEVER.

During the year 1905 no branch of medical scientific enquiry has borne better fruit than the investigation of the etiology of Malta fever by the Mediterranean Fever Commission. The Commission was formed in the early part of 1904, and in June of that year commenced regular investigations. The members of the Commission were Colonel Bruce, F.R.S., Major Horrocks, Staff-Surgeon Shaw, Dr. Zammit of Malta, and Dr. Johnstone of the Local Government Board.

The First Report by Major Horrocks was devoted to a study of the duration of life of the *Micrococcus melitensis* outside the human body. His conclusions were:—

(1) The *M. melitensis* is able to live for six days in a urine which has become alkaline from the presence of ammonia.

(2) The *M. melitensis* survives for sixteen days when spread in a thin layer on a glass cover-slip.

(3) The *M. melitensis* survives for sixty-nine days when planted in a dry sterilised manured soil.

(4) In dry sterilised sand the duration of life of the *M. melitensis* appears to be only twenty days.

(5) In a sterilised manured soil saturated with water the *M. melitensis* appears to survive for only seven days.

(6) The *M. melitensis* is able to live for eighty days on dry fabrics, such as blanket, khaki serge, and khaki cotton.

(7) The *M. melitensis* appears to live for a comparatively short time in sterilised tap-water. It was only recovered in pure culture six days after being planted out, though from the result of Experiment VIII. it appears possible that the duration of life may extend to three weeks.

Major Horrocks' Second Report consisted of "Further Studies on the Saprophytic Existence of *Micrococcus melitensis*," published September, 1904. His conclusions were:—

(1) The *M. melitensis* retains its vitality in sterilised tap-water for thirty-seven days.

(2) In a Maltese soil, allowed to dry naturally, the *M. melitensis* survives for forty-three days; and in one thoroughly dried immediately after inoculation it survives for twenty-one days.

(3) The *M. melitensis* survives for seventy-two days in a damp soil.

(4) Exposure to the sun for a few hours kills the *M. melitensis*.

(5) The *M. melitensis* survives for twenty-five days in sterilised sea-water.

The Third Report, on "The Recovery of the *Micrococcus melitensis* from the Urine, Fæces, and Sweat of Patients Suffering from Mediterranean Fever," is by Major Horrocks, in conjunction with Captain Kennedy. Up to September, 1904, the *M. melitensis* had been isolated thirty-nine times from the urine of thirteen different patients. The micrococcus was isolated not earlier than the fifteenth day in Malta fever and not later than the eighty-second day of the disease. The examination of fæces for recovery of the coccus proved negative, although as many as 1,026 plates were made from eighty-six stools. Major Horrocks remarks that many of the streptococci occurring in stools bear a superficial resemblance to the *M. melitensis*. From the sweat the *M. melitensis* had not been isolated at the time of the Report (September, 1904); the infection of bacteria-free sweat from Malta fever patients did not give the characteristic agglutinins in the blood of monkeys experimented upon; but in one experi-

Colonial Medical Reports.—No. 17.—BASUTOLAND (*continued*).

RETURN OF DISEASES AND DEATHS IN 1904, AT THE

Basutoland Hospitals.

GENERAL DISEASES.					GENERAL DISEASES—continued.		
	Admis- sions.	Deaths.	Total Cases Treated.		Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism	—	—	4	Other Tubercular Diseases	—	—	—
Anaemia	1	—	70	Varicella	—	—	69
Anthrax	1	—	5	Whooping Cough	—	—	79
Beri-beri	—	—	—	Yaws	—	—	—
Bilharziosis	—	—	—	Yellow Fever	—	—	—
Blackwater Fever	—	—	—				
Chicken-pox	—	—	—				
Cholera	—	—	—				
Choleraic Diarrhoea	—	—	—				
Congenital Malformation	—	—	—				
Debility	4	—	211				
Delirium Tremens	—	—	—				
Dengue	—	—	—				
Diabetes Mellitus	—	—	6				
Diabetes Insipidus	—	—	—				
Diphtheria	4	1	5				
Dysentery	5	1	32				
Enteric Fever	14	1	24				
Erysipelas	—	—	9				
Febricula	5	—	127				
Filariasis	—	—	—				
Gonorrhoea	—	—	345				
Gout	—	—	12				
Hydrophobia	—	—	—				
Influenza	1	—	31				
Kala-Azar	—	—	—				
Leprosy	—	—	—				
(a) Nodular	—	—	6				
(b) Anaesthetic	—	—	5				
(c) Mixed	—	—	4				
Malarial Fever—	—	—	—				
(a) Intermittent—	—	—	—				
Quotidian	—	—	—				
Tertian	—	—	—				
Quartan	—	—	—				
Irregular	—	—	—				
Type undiagnosed	—	—	—				
(b) Remittent	—	—	—				
(c) Pernicious	—	—	—				
(d) Malarial Cachexia	—	—	—				
Malta Fever	—	—	—				
Measles	—	—	3				
Mumps	—	—	73				
New Growths—	—	—	—				
Non-malignant	53	2	155				
Malignant	4	1	6				
Old Age	—	—	—				
Other Diseases	—	—	—				
Pellagra	—	—	—				
Plague	—	—	—				
Pyæmia	1	1	3				
Rachitis	—	—	9				
Rheumatic Fever	—	—	—				
Rheumatism	6	—	741				
Rheumatoid Arthritis	—	—	—				
Scarlet Fever	—	—	—				
Scurvy	6	—	52				
Septicæmia	—	—	—				
Sleeping Sickness	—	—	—				
Sloughing Phagedæna	—	—	—				
Small-pox	—	—	—				
Syphilis—	—	—	—				
(a) Primary	—	—	11				
(b) Secondary	—	—	377				
(c) Tertiary	16	—	765				
(d) Congenital	—	—	269				
Tetanus	—	—	—				
Trypanosoma Fever	—	—	—				
Tubercle—	—	—	—				
(a) Phthisis Pulmonalis	8	2	75				
(b) Tuberculosis of Glands	10	—	58				
(c) Lupus	—	—	—				
(d) Tabes Mesenterica	5	—	10				
(e) Tuberculous Disease of Bones	5	—	12				

LOCAL DISEASES.				
Diseases of the—				
Cellular Tissue	42	1	325	
Circulatory System—				
(a) Valvular Disease of Heart	6	1	76	
(b) Other Diseases	6	3	75	
Digestive System—	14	2	6,004	
(a) Diarrhoea	—	—	—	
(b) Hill Diarrhoea	—	—	—	
(c) Hepatitis	—	—	—	
Congestion of Liver	—	—	—	
(d) Abscess of Liver	—	—	—	
(e) Tropical Liver	—	—	—	
(f) Jaundice, Catarrhal	—	—	—	
(g) Cirrhosis of Liver	—	—	—	
(h) Acute Yellow Atrophy	—	—	—	
(i) Sprue	—	—	—	
(j) Other Diseases	—	—	—	
Ear	4	—	275	
Eye	84	—	675	
Generative System—				
Male Organs	15	2	103	
Female Organs	50	—	544	
Lymphatic System	—	—	101	
Nervous System	16	—	309	
Nose	1	—	104	
Organs of Locomotion	25	—	133	
Respiratory System	11	1	2,006	
Skin—	—	—	—	
(a) Scabies	—	—	61	
(b) Ringworm	—	—	71	
(c) Tinea Imbricata	—	—	—	
(d) Favus	—	—	1	
(e) Eczema	2	—	321	
(f) Other Diseases	4	—	551	
Urinary System	3	—	62	
Injuries, General, Local—	—	—	—	
(a) Siriasis (Heatstroke)	—	—	—	
(b) Sunstroke (Heat Prostration)	—	—	—	
(c) Other Injuries	41	2	351	
Parasites—	—	—	—	
Ascaris lumbricoides	—	—	2	
Oxyuris vermicularis	—	—	28	
Dochmius duodenalis, or Ankylos- toma duodenale	—	—	—	
Dracunculus medinensis (Guinea- worm)	—	—	—	
Tape-worm	—	—	74	
Poisons—	—	—	—	
Snake-bites	—	—	2	
Corrosive Acids	—	—	—	
Metallic Poisons	—	—	1	
Vegetable Alkaloids	—	—	—	
Nature Unknown	—	—	—	
Other Poisons	—	—	2	
Surgical Operations—	—	—	—	
Amputations, Major	—	—	27	
Minor	—	—	2,002	
Other Operations	—	—	—	
Eye	—	—	—	
(a) Cataract	—	—	—	
(b) Iridectomy	—	—	—	
(c) Other Eye Operations	—	—	—	

RETURN OF THE STATISTICS OF POPULATION FOR THE YEAR 1904.

	Europeans and Whites	Basuto	Mixed and Coloured
Number of inhabitants in 1904	895	347,731	222
Number of inhabitants in 1891	578	218,324	180
Increase	217	129,407	42

METEOROLOGICAL RETURN FOR THE YEAR 1904.

	TEMPERATURE				Rainfall, Amount in Inches
	Shade Maximum	Shade Minimum	Range	Mean	
January	97	48	49	72	7·80
February	89	46	43	67	4·36
March	84	46	38	60	1·93
April	84	28	56	56	1·23
May	74	24	50	49	·60
June	69	17	52	43	1·78
July	69	20	49	44	—
August	81	21	60	50	—
September	81	25	56	53	·69
October	88	33	55	60	1·46
November	96	38	58	67	2·80
December	101	42	59	71	·70

Colonial Medical Reports.—No. 18.—Northern Nigeria.

MEDICAL REPORT FOR THE YEAR 1903.

By Dr. S. W. THOMPSTONE.

Principal Medical Officer.

ESTIMATED POPULATION FOR THE YEAR 1903.

THE average European population resident in Northern Nigeria during the year was 309. This includes both officials (civil and military) and non-officials (traders, missionaries, &c.).

DEATHS.

There were 18 deaths during the year, 12 amongst officials, and 6 amongst non-officials. Of the total deaths 3 occurred in action, and 1 from ptomaine poison, leaving altogether 14 deaths which were attributable to the effects of the climate.

DEATH-RATE PER 1,000.

This gives a total death-rate of 58·25 per 1,000 calculated on the average resident population, or, excluding the four deaths above referred to, of 45·3 per 1,000.

COMPARISON WITH LAST YEAR.

Last year the average resident population was 290, and the number of deaths 9, a death-rate of 31·03 per 1,000. There has been an increase of population over last year therefore of 19, and in the total death-rate of 27·2 per 1,000. Comparisons made between statistics

of mortality based on such a relatively small population as that of Northern Nigeria, which has been occupied by Europeans for so short a time, are, however, obviously fallacious, and until records of a number of years are available it cannot be stated that the death-rate of one year is above or below the normal rate.

PREVALENCE OF SICKNESS IN THE DIFFERENT SEASONS OF THE YEAR, AND CHARACTER AS TO MILDNESS OR SEVERITY OF DISEASES PREVAILING.

The months of September, October, November and December, show the greatest amount of sickness, and March, April, May and June, the least, the rainy season having been the most unhealthy part of the year.

The character of the various diseases met with has not changed, with the exception that blackwater fever has assumed a more severe form, the cases have been more serious and the death-rate higher.

RELATIVE MORTALITY IN THE DIFFERENT SEASONS.

The greatest number of deaths in any one month occurred in September. There were no deaths in February, June and August.

METEOROLOGICAL CONDITIONS OF THE SEASONS.

The rainfall during the year was 32·88 inches at Zungeru, and 59·85 at Lokoja—the greatest recorded having been at Lokoja in September, when it amounted to 13·97 inches in the month. The average at the two stations at which complete records were kept was 46·36 inches for the year. The maximum shade temperature in Lokoja was 101° in March, the minimum 56° in January. The highest mean temperature was 84·4° in March, and the lowest 78·4° in August. Last year the maximum shade temperature was 102° in June, and the minimum 51° in December. The highest mean temperature was 85° in April, and the lowest 72° in November. The rainfall at Lokoja in 1902 was 53·61 inches. In Zungeru the maximum shade temperature was 107°, which was recorded in March, and the minimum 60° in November. The highest mean temperature was 89·7° in March, and the lowest 78·4° in August. The highest mean relative humidity was 86·6 per cent. in August, and the lowest in December, 55·4 per cent. Hygrometrical observations were not taken, however, until May. The general direction of the wind was S.W. for the greater part of the year both at Zungeru and Lokoja. I append a chart which shows graphically the seasonal variations of mean temperature, relative humidity, rainfall and sickness rate.

New meteorological stations have now been established in all provinces, and returns will be available for the next annual report, which will give more representative records of the different degrees of temperature, rainfall, and relative humidity met with throughout the Protectorate.

PARTICULAR DISEASES DURING THE YEAR.

The prevalent diseases among Europeans have been malarial fevers and dysentery. Of the former (excluding blackwater) there were 384 admissions with 2 deaths, and of the latter 41 admissions with no

deaths. Sixteen cases of blackwater fever occurred throughout the Protectorate during the year, with 6 deaths, a case mortality of 37·5 per cent. There were 3 cases of small pox amongst Europeans, with no deaths.

GENERAL SANITARY CONDITION OF THE PROTECTORATE.

The general sanitary condition of the stations occupied by Europeans is being improved gradually, but much yet remains to be done. The Government premises are kept clean, and are well drained, but the water supply in most out-stations is poor, and the houses merely temporary mud and grass structures. The native towns, with the exception of those in the vicinity of the European settlements, are practically in their primitive condition.

ZUNGERU.

Sanitary State of the Principal Stations with reference to Water Supply, Drainage, &c.

Average European population, 50.

Deaths during the year, 5.

The general sanitary condition of Zungeru is good, the cantonment is kept clean, and is well supplied with surface drains running down to the Dago river, which effectually carry off all surface water. The general health of Europeans throughout the year has been good.

Water Supply.

The water supply is derived from the Dago river, which flows through the cantonment; it has not proved satisfactory during the dry season, owing to the extreme drought, drinking water having had to be carried a long distance from the Kaduna river. A scheme is now in progress for damming the stream, which is hoped will keep it running in future. Tanks are also being fitted round the bungalows to collect rain-water. A pumping station on the Kaduna would solve the problem of obtaining a good supply the year round.

Disposal of Refuse.

The dry earth system for the disposal of excreta is in use, and has proved satisfactory—the contents of pails being buried in trenches. All combustible refuse is burnt, and the rest buried at some distance from the cantonment.

LOKOJA.

Average European population, 42.

Deaths during year, 2.

The sanitation of Lokoja has much improved recently—the Government premises being in good condition, and the lines occupied by native soldiers clean.

Water Supply.

This is derived from the Niger river, and is distilled before being issued for drinking purposes; the supply is ample, and the quality all that can be desired.

Disposal of Refuse.

As at Zungeru and all other Government stations.

Drainage is satisfactory, by surface drains to the river.

The hospital accommodation is quite inadequate for a station of this size, through which all the invalids in the Protectorate pass on their way to England. A new hospital is, however, now in course of erection, which will amply meet all requirements for some years to come. It will probably be ready for occupation in April next.

ILLORIN.

European population, 12.

Deaths during the year, 1.

The sanitary condition of this station is good, except as regards the position of the native barracks, which are too near the Europeans. These are being moved.

Water Supply.

The drinking water for the Europeans is obtained from a well about 30 feet in depth; its quality is fair.

Disposal of Refuse.

As in all other stations.

Drainage good.

SOKOTO.

European population, 8.

Deaths during the year, none.

The general sanitary condition is good. There is, however, a good deal of swamp in the wet season near both the fort and the Residency, which requires draining. Much has been done, but much still remains. Near the fort it is especially improved, but that near the Residency is a much more serious matter, and will take much time and labour to render satisfactory from a sanitary point of view. All that can be done is being done in this direction.

Water Supply.

This is obtained from rock springs in good positions; the water is of excellent quality.

Disposal of Refuse.

As elsewhere.

Drainage: Open drains have been, and are being cut, to take off surface water.

KANO.

European population, 14.

Deaths during year, none.

The European station is situated about three-quarters of a mile from the native town of Kano, and consists of the Residency and the military lines, the latter lying about 200 yards south-east of the former. The Residency used to be the former Emir's summer residence, and consists of blocks of houses and several outhouses. The general sanitary condition is satisfactory, except during the rains, when drainage is difficult, owing to the flatness of the surrounding country.

Water Supply.

All water is obtained from wells, and is boiled and filtered before use.

Disposal of Refuse.

By burning and in trenches.

ZARIA.

European population, 25.

Deaths during the year, 1.

The present site occupied by the civil population is unsatisfactory. The military lines have been moved four miles away to Dandua, a much better position from a sanitary point of view; the question of moving the civil population is under consideration.

Water Supply.

This is poor, being derived from wells, none of which are above suspicion, the quality is inferior, and the supply meagre.

At Dandua there is a running stream of good water.

Disposal of Refuse.

As in other stations.

YOLA.

European population, 8.

Deaths during the year, none.

The sanitary condition of this station is good. In the early part of the year much annoyance was caused by mosquitoes. A "mosquito brigade" was organised in August, and the Medical Officer reports that he has now filled all possible breeding places within 800 yards of the Residency with sand and planted grass over them. Mosquitoes are now rarely found in the vicinity of the European dwellings.

Water Supply.

The water is obtained from the Benue, poured into settling jars, boiled, and passed through a Berkefeld drip filter.

Drainage.

Good, except in one place, to the west of the Residency, where a swamp formed during the wet season. This, however, only existed for a short time when the rains were at their heaviest.

VACCINATIONS PERFORMED DURING THE YEAR AND THE CONDITION OF THE POPULATION IN RESPECT OF PROTECTION FROM SMALL-POX.

Systematic vaccination in Northern Nigeria has been commenced during the year. Arrangements have been made for a small weekly supply of lymph to be sent to all stations, as it is found from experience that there is great difficulty in obtaining it in an active condition if kept in this climate for more than a few weeks at the outside.

The native population is at present (with the exception of 174 cases successfully vaccinated during the last three months, and those who have already suffered from the disease) entirely unprotected from small-pox. On account of the enormous size of the Protectorate, and the relatively small staff available for these duties, it will be many years before much can be done to vaccinate even a small proportion of the inhabitants, but in view of the frequency of outbreaks of this disease, it is of the utmost importance that active measures should be taken to protect, at any rate, those natives who live in the vicinity of European stations.

Colonial Medical Reports.—No. 18.—Northern Nigeria—
(continued).**GENERAL HEALTH.***Europeans.*

The general health has not been so good as last year, both the death and invaliding rates having been higher for all classes of the community. Analysis of the statistics of mortality for the year shows that the

cent.; the non-official death-rate being 13·8 per cent. greater than the official for the year.

There have been 34 officials and 9 non-officials invalided in the twelve months, a total invaliding rate of 13·9 per cent.

Natives.

The total number of natives treated at the Government hospitals and dispensaries during the year was 3,983, an increase over the previous year of 876.

A serious outbreak of small-pox occurred at Lokoja in June. The disease was introduced by freed slaves brought down the Benue. Fortunately, however, by prompt isolation and vaccination of contacts it was prevented from spreading to the native town. There were altogether 77 cases, with 8 deaths.

Steps are being taken for the provision of permanent enclosures for the isolation of infectious disease both at Lokoja and Zungeru, in which grass huts, which can be burnt when no longer required, will be built as wanted.

The amount of venereal disease met with is still regrettably large, there having been 627 cases of gonorrhœa treated during the year, and 98 cases of syphilis.

I attach the following returns:—

- A. Statistics of European population.
- B. Nosological Returns, Zungeru.¹

No. 19.—Northern Nigeria.—Medical Report for 1904.

By DR. S. W. THOMPSTONE, *Principal Medical Officer.*

ESTIMATED POPULATION FOR THE YEAR 1904.

As in former years statistics of European population only are given, it being impossible to estimate with any approach to accuracy the number of natives in the Protectorate.

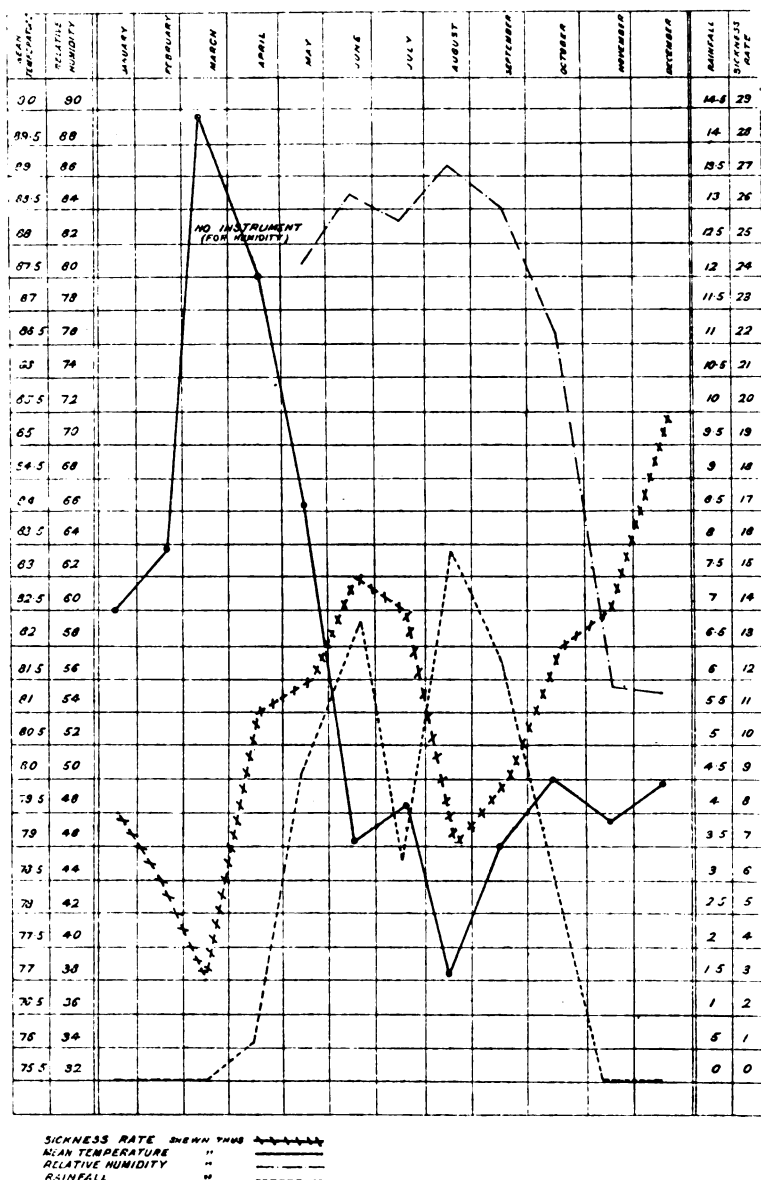
The average number of Europeans resident in Northern Nigeria during the year was 322, including both officials and non-officials—312 being males and 10 females.

DEATHS.

There were 13 deaths in all during the year, 8 amongst officials, and 5 among non-officials. Of these deaths 1 was due to accident, leaving 12 attributable to climatic causes.

DEATH-RATE PER THOUSAND.

The total death-rate for the year, calculated on the average resident population, and including deaths from all causes, was 40·37 per 1,000, or excluding the one accidental death, 37·26. There is a very noticeable difference in the relative mortality of officials and non-officials, there having been 5 deaths



death-rate from climatic causes among Government officials has been remarkably less than among the non-official population. There were resident during the year an average of 273·8 officials in the Protectorate, amongst whom there were 9 deaths from disease, a death-rate of 3·2 per cent., the average resident non-official population for the same period being 35·2 with 6 deaths, a death-rate of 17·04 per

¹ Diagram only printed.

amongst 52 non-officials, as against 8 deaths (including one from accident) amongst 270 officials, giving a non-official death-rate of 96.15 per 1,000, and an official one of 29.62. This difference being brought about almost entirely by the more careful selection of candidates for employment in Government service, and by their shorter tour of residence—many of the men sent out by the trading firms being obviously physically unfit for tropical service.

COMPARISON WITH PREVIOUS YEAR.

Last year the average resident population was 309, and the number of deaths 18—the death-rate being 58.25 per 1,000. There has been an increase of European population over last year of 13, and a decrease in the death-rate from all causes of 17.88 per 1,000.

PREVALENCE OF SICKNESS IN THE DIFFERENT SEASONS OF THE YEAR, AND GENERAL CHARACTER AS TO THE MILDNESS OR SEVERITY OF THE DISEASES PREVAILING.

As in former years, the rainy season was the most unhealthy for Europeans, July being the worst month, and the month with the heaviest rainfall. The smallest number of admissions was recorded in February. The general character of the diseases prevailing showed no change except in the case of hæmoglobinuric fever, which has become more prevalent but has assumed a milder type. There were 31 admissions with 5 deaths from this disease during the year—a case mortality of 16.1 per cent.—as against 16 cases with 6 deaths in 1903. An increase in the number of cases with a very marked reduction in the death-rate—the case mortality last year having been 37.5 per cent.; one case of enteric fever occurred in Bornu—the first recorded in Northern Nigeria.

RELATIVE MORTALITY IN THE DIFFERENT SEASONS.

There was practically no difference in the relative mortality in the different seasons, the deaths being pretty evenly distributed throughout the year. There were no deaths during the months of January, March, September, and December.

METEOROLOGICAL CONDITIONS OF THE SEASONS AND THEIR PROBABLE EFFECT WITH REGARD TO HEALTH.

Zungeru.—The rainfall during the year was 51.1 inches, or 18.22 inches more than in 1903, the wettest month being July, with 15.07 inches. Rain fell during eight months of the year, from March to October, inclusive—the heaviest fall recorded being 2.64 inches in the twenty-four hours, on August 24th. The maximum shade temperature was 103° F. in March and April, the minimum, 56° F., which was recorded in November, December, and January. The highest mean temperature was 86° in April, and the lowest 77° in July, August, and December, the mean temperature for the year being 79°. The mean relative humidity for the year was 63.6 per cent., the highest mean being 82 for July, and the lowest 38 for December—calculated from readings taken at 9 a.m. The lowest actual relative humidity recorded was 15, from hygrometer readings taken at 4 p.m. on December 27th.

Lokoja.—The total rainfall was 41.72 inches for

the year, or 18.13 inches less than last year—the heaviest rainfall having been in July, 8.34 inches. The maximum shade temperature was 102° on March 11th, and the minimum 57° on December 23rd. The highest mean temperature was 86° in March, and the lowest 79° in July, August, September, and December. The mean temperature for the year was 80° F.

Yola.—Total rainfall 33.77, the greatest recorded being 10.99 inches in August; the heaviest fall occurring on June 21st, 2.10 inches.

The mean temperature for the year was 80°, the maximum being 107° F., which was recorded on March 16th, and the minimum 60°, on January 13th.

Complete statistics are not available from any other stations, as their meteorological instruments did not arrive until after the commencement of the year.

The general direction of the wind throughout the Protectorate was from the south-west from June to November, and from the north-east during the remaining months of the year; the Harmattan lasting, with slight intermissions, from December to the end of May; the first tornadoes occurring in March, and the rainy season ending in October.

With regard to the probable effect of the meteorological conditions on the health of the community, it may be stated generally that Europeans have the best health in the dry season, and natives in the rains. Europeans, by taking proper precautions, avoiding in great part the diseases that affect the native in the dry season when water is scarce and polluted, and the native being less affected by the great cause of the excessive mortality among Europeans—malaria—a disease more especially of the wet season.

PARTICULAR DISEASES THAT HAVE OCCURRED DURING THE YEAR.

By far the greatest amount of sickness during the year has been due, as in the past, to malaria; the total admissions from this disease (excluding black-water fever for the sake of convenience) having been 515, with 3 deaths, compared with 386 admissions with 2 deaths last year. Thirty-one cases of hæmoglobinuric fever occurred with 5 deaths, and 18 of dysentery with no deaths. Dysentery is becoming much less prevalent, the total admissions for the year being less than half those in 1903. There were two cases of small-pox among Europeans, with no deaths.

GENERAL SANITARY CONDITION OF THE PROTECTORATE.

The general sanitary condition of the European stations is good. The principle of forming separate locations for natives and Europeans has been carried out in all cases as far as possible, and sites have been chosen for permanent buildings in the headquarters of the various provinces. The question of improving the water supply is being solved in great measure by the supply of small condensers.

The large native towns are still in their original condition as regards sanitation, and it will be probably many years before anything can be done to improve them. They are kept clean as far as outward appearances go, but the old system of digging wells and privies side by side obtains everywhere, and probably accounts for most of the intestinal diseases met with amongst natives.

**SANITARY STATE OF THE PRINCIPAL STATIONS WITH
REFERENCE TO WATER SUPPLY, DRAINAGE, &c.**

Zungeru.—The headquarters of the Protectorate has an average resident population of 69·5 Europeans, 66 officials, and 3·5 non-officials. The cantonment is kept clean, and is well supplied with surface drains running down to the Dago river, which effectually carry off all rain-water. Early in the year a series of dams was constructed across the river with the object of holding up the water and providing for a continuous flow throughout the dry season. The system has proved most successful, and a condenser has been erected which provides the European residents with a plentiful and pure supply of drinking water the whole year round. In addition to this, iron tanks have been fitted to most of the bungalows to store rain-water during the wet season.

Disposal of Refuse.—The dry-earth system is in use for excreta—as is the case in all Government stations—the contents of the pails being emptied into shallow trenches and buried. All combustible refuse is burnt daily, and the rest buried at some distance from the cantonment.

The general health of the official population has been good; that of the employes of the Niger Company extremely bad. This difference is due, as pointed out earlier in this report, principally to the want of care exercised in the selection of suitable men, and the long tour of service required of them.

Lokoja had an average resident population during the year of 65·9 Europeans, 51·7 officials, and 14·2 non-officials. The sanitary condition of the European quarter is good, and the lines occupied by the native soldiers are well kept and clean. The cantonment is well supplied with surface drains running down to the Niger, and refuse is disposed of as at all other stations.

Drinking water is supplied by a condenser from the river; the supply is ample, and the quality excellent. The new hospital for Europeans, referred to in my last report, has been completed, and has been in use since May. It is cool, well ventilated, and large enough to meet all requirements for some years to come.

Zaria.—The average resident European population during the year was 23. The site now occupied by the civil population is most unsatisfactory, the water supply is insufficient and bad, and the ground unsuitable. A new site at Dandua, five miles away, has been occupied by the military during the year, and has proved to be an excellent one. It is proposed to move the entire European population out there early in 1905, and abandon the old situation at Zaria.

The health throughout the year has been good, there having been no deaths. The water supply at Dandua is obtained from a running stream, and is of good quality and ample in amount.

Kano.—The average resident European population during the year was 18·4; the general health was fair.

The sanitary condition of the site at present occupied is as good as the nature of the ground will allow. Drainage is unsatisfactory during the wet season owing to the flatness of the surrounding country—no proper fall being obtainable, and the soil becoming waterlogged in heavy rains. The water

supply is obtained from shallow wells, and is insufficient for the needs of a large population during the dry season. The question of moving to a more suitable locality is under consideration, and several alternative sites have been proposed; no particular place has, however, yet been decided on, the local conditions varying so much at different seasons of the year, that it was considered inadvisable to make a final choice until more extended observations have been made.

**VACCINATIONS PERFORMED DURING THE YEAR, AND
CONDITION OF THE POPULATION IN RESPECT OF
PROTECTION FROM SMALL-POX.**

One thousand three hundred and four successful vaccinations have been performed during the year, all stations being now supplied with a small weekly or fortnightly consignment of lymph. Great difficulty is experienced in obtaining it in an active condition at those stations which are farthest away in the interior, the long journey on carriers' heads in the hot weather rendering it in many cases inert on its arrival. The returns received from the different stations show a regularly decreasing scale of successful vaccinations, according to the distance from Lokoja; Lokoja itself heading the list, with Katagum and Bornu at the bottom.

There have been two more cases of small-pox among the white population during the year, again demonstrating the fact that the disease can be acquired from natives, and refuting the popular theory held by many Europeans to the contrary. The natives throughout the Protectorate, with the exception of those successfully vaccinated during the last two years and those who have already suffered from the disease, are entirely unprotected from small-pox, and all that can be done at present is to vaccinate all Government employes and those natives living in the immediate vicinity of the various stations, anything like general vaccination, though most desirable, being quite impracticable.

GENERAL HEALTH DURING THE YEAR.

The general health of the European community has been fair; the death-rate has been considerably lower, but the sickness and invaliding rates higher than last year. More cases of illness have come under treatment, but of a milder type. There have been 50 officials and 17 non-officials invalided during the year, a total invaliding rate of 20·8 per cent., as compared with 13·9 per cent. last year.

The health of the natives has been good through the year, no serious epidemics have occurred, and the death-rate, so far as can be gathered, has been normal. The total number of natives treated at the Government hospitals and dispensaries was 13,504, an increase over the previous year of 9,521. This very large increase is, however, partly accounted for by a change which has been made in the method of keeping the records of cases—no account having been kept in the past of many of the patients. Dispensaries are being established in the native towns nearest the different provincial headquarters, but they will necessarily be only on a very limited scale at first, the expense of equipping fifteen or twenty stations with the necessary

instruments, drugs, and appliances being very great.

During the year 883 patients have been treated as paupers throughout the Protectorate.

With the object of providing for the isolation of infectious diseases, such as small-pox, &c., in Zungeru and Lokoja, permanent enclosures have now been built in each of these stations, one acre in extent, surrounded by unclimbable iron fencing, and provided with lock-up gates. It is intended when the necessity arises to build temporary grass huts within them, which can be put up quickly when wanted and burnt when no longer required.

Venereal diseases have been very prevalent among natives, syphilis being widely distributed throughout the northern and eastern parts of the Protectorate. Nine cases of beri-beri, eight of them at Lokoja, have been admitted during the year, with two deaths. This disease is not endemic so far as can be ascertained, and all cases met with have occurred in the parts of the Protectorate nearest the sea, and in direct communication with the coast.

I attach the following returns:—

Statistics of European population.

Meteorological returns for Zungeru and Lokoja.

Nosological return for Northern Nigeria.

STATISTICS OF EUROPEAN POPULATION.

All Europeans	1900	1901	1902	1903	1904
Average actually in the Protectorate	165	165	290	309	322
Number of deaths	13	9	9	18	13
Number of invalids	21	30	20	43	67

ANALYSIS OF 1904 STATISTICS.

Europeans	Totals	Deaths	Death-rate per 1,000	Invalids	Invaliding Rate per 1,000
Average actually in the Protectorate	322	13	40.37	67	208.0
Officials	270	8	29.62	50	185.1
Non-officials	52	5	96.15	17	326.9

ZUNGERU METEOROLOGICAL RETURN FOR 1904.

	TEMPERATURE				RAINFALL		WINDS		Remarks
	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	102	56	46	80	—	53	N.E.	—	
February	101	60	41	80	—	55	N.E.	—	
March	103	61	42	84	5.4	47	S.W.	—	
April	103	67	36	86	2.20	55	S.W.	—	
May	97	68	29	81	6.14	71	S.W.	—	
June	92	68	24	79	7.01	77	S.W.	—	
July	89	68	21	77	15.07	82	S.W.	—	
August	90	68	22	77	10.15	81	S.W.	—	
September	90	67	23	78	6.58	77	S.E.	—	
October	94	67	27	79	3.41	76	S.W.	—	
November	98	56	42	78	—	52	N.E.	—	
December	99	56	43	77	—	38	N.E.	—	
Total	—	—	—	—	51.1	—	—	—	

Colonial Medical Reports.—No. 19.—Northern Nigeria—(continued).

LOKOJA METEOROLOGICAL RETURN FOR 1904.

	TEMPERATURE				RAINFALL		WINDS		Remarks
	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	97	59	38	80	—	—	—	—	
February	96	61	35	81	—	—	—	—	
March	102	65	37	86	1.79	—	—	—	
April	97	66	31	83	3.22	—	—	—	
May	94	59	35	80	7.70	65	S.W.	—	
June	93	67	26	81	7.81	77	S.W.	—	
July	91	68	23	79	8.34	77	S.W.	—	
August	88	70	18	79	2.97	76	S.W.	—	
September	90	68	22	79	7.14	78	S.W.	—	
October	92	68	24	80	2.75	76	S.W.	—	
November	96	63	33	81	—	73	S.W.	—	
December	96	57	39	79	—	73	S.W.	—	
Total	—	—	—	—	41.72	—	—	—	

RETURN OF DISEASES AND DEATHS IN NORTHERN NIGERIA IN 1904.

Diseases	EUROPEANS					NATIVES					Remarks
	Remaining at end of 1903	Yearly Total		Total Cases Treated	Remaining at end of 1904	Remaining at end of 1903	Yearly Total		Total Cases Treated	Remaining at end of 1904	
		Admissions	Deaths				Admissions	Deaths			
Small-pox	1	2	—	3	1	3	26	7	29	—	
Chicken-pox	—	—	—	—	—	—	7	—	7	—	
Measles	—	—	—	—	—	—	8	—	8	—	
Enteric Fever	—	1	1	1	—	—	—	—	—	—	
Dysentery	1	18	—	19	1	5	606	94	611	—	
Beri-beri	—	—	—	—	—	2	9	2	11	—	
Malarial Fever	8	515	3	523	3	6	925	8	931	12	
Hæmoglobinuric Fever	—	31	5	31	3	—	1	—	1	—	
Unclassified Fevers	—	10	—	10	1	—	23	—	23	1	
Tubercle	—	—	—	—	—	—	4	—	4	—	
Leprosy	—	—	—	—	—	—	21	—	21	1	
Yaws	—	—	—	—	—	5	18	—	23	—	
Syphilis	—	—	—	—	—	9	210	—	219	10	
Gonorrhœa	—	2	—	2	—	40	796	—	836	27	
Parasitic Disease	—	2	—	2	—	4	967	—	971	15	
Effects of Poisons	—	—	—	—	—	—	3	3	3	—	
Rheumatism	—	17	—	17	—	5	687	5	692	12	
Anæmia	1	28	—	29	—	—	48	10	48	—	
Debility	—	3	—	3	—	1	25	5	26	1	
Undefined	—	4	—	4	—	2	306	28	308	5	
No appreciable Disease	—	—	—	—	—	—	4	—	4	—	
Diseases of the Nervous System	—	14	—	14	—	—	291	5	291	3	
" " Eye	—	8	—	8	1	10	612	—	622	17	
" " Ear	—	7	—	7	—	—	62	—	62	1	
" " Circulatory System	—	5	—	5	—	—	41	7	41	2	
" " Respiratory System	—	15	—	15	—	5	716	33	721	26	
" " Digestive System	1	101	*2	102	—	7	2,134	45	2,141	18	
" " Lymphatic System	—	10	—	10	—	5	192	6	197	4	
" " Genito-urinary System	—	18	—	18	1	4	286	15	290	13	
" " Organs of Locomotion	—	3	—	3	—	2	88	—	90	—	
" " Connective Tissue	—	12	—	12	—	5	842	1	847	35	
" " Skin	—	21	—	21	—	14	944	1	958	26	
Injuries	—	28	—	28	3	14	2,360	18	2,374	53	
Minor Surgical Operations	—	—	—	—	—	—	94	—	94	1	
Accident (Drowning)	—	—	1	—	—	—	—	—	—	—	
Uncertified	—	—	1	—	—	—	—	—	—	—	
Totals	12	875	13	887	14	148	13,356	293	13,505	294	

* Hepatic Abscess.

Colonial Medical Reports.—No. 20.—The Gold Coast.

MEDICAL AND SANITARY REPORT

FOR THE YEAR ENDING DECEMBER, 1904.

By **Dr. KENNETH F. T. BUÉE.***Acting Principal Medical Officer.*

(1) GENERAL REMARKS.

The general health of the Colony has been good.

There has been some increase in the number of cases of small-pox, but the number of deaths has been much lower, 1 in 62, as against 11 in 37 last year.

Measles cases were more numerous, 16 against 6, but there were no deaths.

Dysentery was more prevalent, and shows a total of 82 with 23 deaths, against 56 with 10.

Malaria was slightly less than last year, while the European population is nearly one-tenth greater.

The rainfall throughout was, on the whole, less, an increase over last year being only noted at Axim and Kwitta, and last year's average was low; the result was that in many places lack of water was seriously felt, and vegetables were scarce.

the population has been vaccinated; for the most part the people do not raise conscientious objections and it is mainly due to the moving part of the population that small-pox is kept alive, since they are not easily vaccinated.

(4) METEOROLOGICAL REPORT.

A new station will be started at Sekondi in January. The reports from Accra, Aburi, Cape Coast, Axim, Kwitta, Kumasi, and Gambaga are appended.

The most noticeable feature is the low rainfall, less even than last year.

(5) GOALS OF THE COLONY.

Reports were received from Accra, Adda, Akuse, Axim, Cape Coast, Elmina, Kumasi, Kwitta, Saltpond, Sekondi, Tarkwa, and Winneba.

(2) HEALTH OF THE EUROPEAN COMMUNITY.

How Employed	Number	Deaths	Invalided	Death-rate per 1,000	Invaliding-rate per 1,000
Officials.. .. .	351	8	27	22.79	76.92
Mercantile Firms, &c.	305	3	22	9.83	72.13
Mining Companies	1,222	13	97	10.63	79.37
Missions	75	1	11	13.33	146.66
Total	1,953	25	157	12.80	80.38

The return gives at a glance the points of the European health.

As compared with last year there were more Europeans; the deaths were fewer and the invaliding-rate slightly higher. It seems as though the steps taken everywhere to keep down mosquitoes are bearing some fruit, but in this direction we have been distinctly helped by the dry season.

(3) NATIVE POPULATION.

The health of the native population is fair, the dry weather has in many cases been a cause of suffering and ill-health.

The principal diseases treated were malarial fever, diseases of skin, ulcers, yaws, diseases of intestines and respiratory organs.

Small-pox was not prevalent; there is almost always some present, and probably will be till the whole of

The general health was good. The number of cases treated in hospital was 332, and of these 18 died.

The deaths were as follows:—

Sekondi	...	...	...	3
Elmina	...	...	...	2
Cape Coast	...	...	...	3
Saltpond	...	...	...	2
Accra	...	...	...	4
Adda	...	...	...	1
Akuse	...	...	...	1
Kumasi	...	...	...	2
Total	...	...	...	18

The general sanitary condition of the different prisons was as good as could be expected, taking into consideration the class of building in use. Most of prisons are old forts, and in many cases are badly

adapted for the requirements of a gaol. There are very few solitary cells, and the prisoners are confined in associated wards; a custom to be condemned on physical, sanitary, and moral grounds. A central prison for long-sentence prisoners is on the Estimates for this year. The water and food are generally good and sufficient.

The medical officers in charge of the various gaols report as follows;—

Accra.—General health very good throughout the year. Diet good; water good, but occasionally rather scarce. Ventilation of cells good. The prisoners are employed at trades in the prison, and outside at road making and repairing, street repairing, sanitary work, &c.

Adda.—Health good; diet and drinking water good; ventilation poor. Prisoners employed repairing public roads and general scavenging.

Akuse.—On the whole the health of the prisoners during the year was good. Diet and water good; ventilation of cells and wards good.

Axim.—The general health of the prisoners during the year was good. Food good; water good; ventilation of cells and wards fair. Prisoners employed at road repairing, whitewashing, carrying water, &c.

Cape Coast.—Health good; both diet and drinking-water good. Some difficulty in obtaining a sufficient supply of good water during the dry season; ventilation of cells and wards primitive and inadequate; the accommodation is insufficient. Prisoners employed at emptying latrines, cutting firewood, clearing Government land, and carrying water.

Elmina.—Health good; diet and water good; ventilation of cells and wards quite inadequate—very bad. Prisoners employed at cooking, grinding corn, mat and basket making, and public works.

Kumasi.—Health good; food and water both sufficient and good; ventilation fair. Prisoners employed at road-making and cleaning, garden, and general scavenging.

Kwitta.—On the whole the health has been good; diet good; water fairly good; cells and wards are not well ventilated. Prisoners employed for emptying latrines, labour on town roads.

Saltpond.—General health has been good; diet and drinking water good; ventilation satisfactory; employed at usual work.

Sekondi.—General health good; diet and drinking water good; ventilation of cells and wards not very good. Prisoners employed at road making and sanitary work.

Tarkwa.—General health fairly good; diet and drinking water good; ventilation of cells and wards not very good. Prisoners employed at usual general work.

Winneba.—General health fairly good; diet and drinking water good; ventilation of cells and wards good. Prisoners employed at usual general work.

(6) THE LUNATIC ASYLUM.

There were 71 patients remaining under treatment in the asylum at the end of 1903, and during the year 1904, 34 new cases were admitted, making a total of 105 cases, 83 males and 22 females. During the year 30 were discharged from the asylum, 14 died, and

1 absconded, leaving 60 patients under treatment at the end of 1904. Of the patients who died 12 were males and 2 females; an inquest was held in every case. The health of the lunatics has been fairly satisfactory, and of the 14 deaths during 1904, 12 were in-patients who had been recently brought in from Axim and Sekondi districts.

The food of the inmates of the asylum has been generally of good quality. The water supply is good and the quality excellent; it is stored in the large tank situated in front of the asylum, and its distribution has been carefully supervised.

The occupation of inmates consists chiefly in gardening, emptying latrines and general household duties. A few patients take willingly to work in the garden; most, however, refuse absolutely to do any work.

(7) SANITARY REPORT.

During the past year great improvements in the sanitation of many of the principal towns in the Colony have been carried out, more especially in the Cape Coast and Sekondi. The resistance to sanitation on the part of the native population of Cape Coast still continues, but not to such an extent as during the previous year, although it is still comparatively active. In other towns it is of a more passive nature; the native is satisfied with the conditions in which he has lived for centuries, and does not wish for anything better.

I append a short summary of the sanitary condition of the principal towns:—

Accra.—The control of the sanitation of Accra is vested in the Town Council. This body, in July, 1903, obtained the services of a European Inspector of Nuisances, trusting that the employment of such an official would tend to promote greater cleanliness and a general improvement in the sanitation of the municipal area. As regards the general cleanliness of the main streets and dust-bins of the town, there has been some improvement, but much yet remains to be done to improve the back streets and outskirts of the town. The water supply, the disposal of sewage, and the removal of ruinous buildings, are all most important, and are all receiving attention. The present dust-bins are inadequate in size, and are being replaced, as funds permit, by larger and better ones. A properly erected incinerator would be of great benefit to the town. An Order in Council has been issued that all tanks, wells, &c., should be rendered mosquito-proof. The new market has been opened at Christiansborg.

Cape Coast.—Great difficulty is experienced in dealing with the drains in many parts of the town. This is largely due to the peculiar construction of these drains and to their being inaccessible. The difficulty is chiefly felt in dry weather.

Owing to the latrines having to be emptied by prison labour, this work has not at all times been satisfactorily performed. The Medical Officer of Health has no authority over these men.

This will probably be improved now that a European gaoler has arrived.

The water supply for domestic purposes is unreliable both as regards quantity and quality.

The work of cleaning the town, filling up holes,

treatment of refuse, and general prevention of Anopheles breeding, continues.

Sekondi.—The neighbourhood of Sekondi is more or less hilly, and certainly picturesque. European Sekondi is well segregated from Native Sekondi, and is proportionately healthy and clean in consequence. Many of the official bungalows are built on the surrounding eminences facing the sea, and a delightful breeze does much to mitigate the unpleasantness of the high temperature.

The town naturally lends itself to sanitation, and its newness, segregation, and cleanliness are factors that will tell considerably as regards its suitability for European habitation. There is no reason why Sekondi should not be one of the healthiest towns on the West Coast.

The small rainfall and the consequent scarcity of drinking water, and the presence of the lagoon between Accra and Lagos Towns are perhaps the two greatest drawbacks to contend with, but these are not insurmountable difficulties nor should they be very costly ones.

Axim.—The town of Axim is in a fairly good sanitary state. The number of scavengers is limited, considering the area of the town, but they are assisted by prison labour. The outlying villages are not in a satisfactory state, as most of the inhabitants are engaged in the catching and curing of fish.

Elmina.—The town of Elmina has been kept clean, and as free as could possibly be done from mosquitoes, by supervision being strict in not allowing stagnant water to remain in empty tins, &c. This, no doubt, accounts for the comparative freedom from malarial fever.

The other towns in the district when visited have on the whole been found fairly clean.

Tarkwa.—The sanitary condition of Tarkwa is good. Water is plentiful and fairly good.

Kwitta.—The station is at present in fairly good order. The streets are fairly clean, the town is dry and healthy. The Government bungalows are in good order.

In nearly all the other towns of the Colony some sanitary improvements have been carried out; but there is nothing of any special interest to record.

(8) DEPARTMENTAL.

Medical Officers.—The Medical staff has been up to its full strength.

One medical officer died during the year.

European Nursing Staff.—The staff has been up to its full strength.

Dispensers.—The staff of dispensers is at present below its strength, owing to resignations and dismissals.

Native Nursing Staff.—This is also at present short-handed.

APPENDIX I.

REPORTS ON HOSPITALS.

Report on the Colonial Hospital, Accra, for the Year ended December 31, 1904.

I have the honour to report that I took over charge of the above hospital from Dr. Rutherford on

December 10th, 1904, Dr. Kennen being in charge of the Dispensary.

There have been no important structural alterations during the year. The large tank in front of the asylum has been repaired and cleaned.

IN-PATIENTS.

The number treated during the year 1904 was 383, as against 469 in 1903.

The 383 for 1904 were compared as follows:—

Europeans 23, as against 51 for 1903.

Native officials 28, as against 45 for 1903.

Civil Police 127, as against 118 for 1903.

Native non-officials 201, as against 255 for 1903.

Hausa W.A.F.F., 4.

Small-pox in 1904, 9.

OUT-PATIENTS.

New cases, 1904:—

Males 969, as against 1,759 for 1903.

Females 629, as against 1,170 for 1903.

Civil Police 987, as against 1,164 for 1903.

Old cases treated during 1904, 3,079.

Twenty operations were performed during the year, with two deaths.

The mortality amongst Europeans remains low, there being but one death in hospital (non-official); the same as in 1903, and against three in 1902, and seven in 1901.

The native mortality in hospital was 33, as against 31 in 1903.

EXPENDITURE.

The total expenditure for diets in 1904 was £172 9s. 10d., as against £265 8s. 2d. for 1903. The largest expenditure was in the month of February, £20 10s. 10d.; the lowest in May, £9 2s. 6d. The amount recovered from patients was £87 14s. 3d., as against £145 5s. 7d. for 1903.

An examination was held in July for druggists' licences; there were three candidates, of whom one passed.

DISPENSARY.

The dispensary has been under the charge of Mr. Cato, assisted by Mr. Laryea.

NURSING.

During the year the nursing has been under the charge of Nursing Sisters Oram, Marshall and Fraser, and a native staff.

THE HOSPITAL.

This is well kept, considering the deficient water supply, *vide* Meteorological Report *infra*.

Native nurses and dressers are difficult to obtain; considering night work and the care and attention their employment necessitates, their salaries are inadequate for suitable persons.

METEOROLOGICAL.

Readings have been taken twice daily.

Rainfall 17.28 ins., as against 20.04 in 1903.

The largest rainfall was in May, 3.90 ins., and June, 8.97 ins.

The highest solar radiation reading was in May, 145.83.

Shade minimum, 62.87, in July.

(Signed) R. D'ARCY IRVINE,
Senior Medical Officer.

Colonial Medical Reports.—No. 20.—The Gold Coast—
(continued).

Report on the Colonial Hospital, Axim, for the Year ended December 31, 1904.

The hospital consists of a European ward of three beds, and a native ward of eight beds. A store-room, pharmacy, and two bedrooms, one of which is occupied by the dispenser and the other by the dresser.

Both wards are large enough for ordinary requirements, but both have been fully occupied on two occasions.

The hospital has been painted during the year, and is now in a much more satisfactory state.

The number of new patients treated in the out-patient department was 802, as compared with 740 in 1903. The attendances of old cases were 2,555, as compared with 4,023 in 1903.

The number of patients admitted into hospital was 162, as compared with 50 in 1903. Very many of these cases, however, did not contract their illness in Axim, but were sent in from outlying bush villages, mining companies, and timber concessions on the Ancobra River. There were several cases admitted, practically moribund, the total number of deaths for the year being thirteen.

(Signed) A. MACQUEEN,
Medical Officer.

Report on the Colonial Hospital, Cape Coast, for the Year ended December 31, 1904.

The number of admissions for the year was considerably lower than that of the preceding year, being 306, against 586 in 1903. This is largely accounted for by the marked improvement in health of both European and Native communities. It is also probable that the floating population in Cape Coast has decreased very considerably since 1903. There was also a marked decrease in small-pox, 100 more cases being recorded in 1903 than in 1904.

Thirty deaths were recorded for the year—a number that cannot be regarded as large when we consider that in many cases natives only bring a case to hospital when they have given up any hope of treating it successfully themselves.

- (1) Remittent malarial fever.
- (2) Pulmonary diseases, such as bronchitis, pneumonia, pleurisy.
- (3) Intestinal diseases, such as dysentery, diarrhoea, colic.
- (4) Small-pox, and a number of injuries of various nature.

Amongst those cases admitted there were three diagnosed as cerebral hæmorrhage, having aphasia without loss of consciousness in the early stage.

One case of sleeping sickness occurred in a Hausa soldier. In deference to Mahomedan custom a *post-mortem* examination was withheld.

A convict prisoner admitted with brain symptoms of an indefinite character, accompanied by fever, died after some days' illness.

As I suspected cerebro-spinal meningitis, I held a *post-mortem* examination with Dr. Claridge. Well-marked meningitis was discovered, and pus was found between the brain and the arachnoid membrane.

Amongst the injuries, one case of severe extensive burn ended in death from shock.

One case of gunshot wound died.

A case of compound fracture of the femur led to amputation of the thigh, the case being now nearly fit for discharge from hospital.

In the case of the European who died in hospital, it would appear that his sickness commenced as an infectious influenza cold, as the two Europeans in the factory contracted the disease at the same time. The deceased had been under treatment of a private practitioner, who left the country soon after, and I was called to see the case.

I found the patient was in a state of delirium, due to the abuse of alcohol, and he had been wandering about the house in the night, although in a most serious condition, his temperature being at 106°.

He was admitted to the hospital without delay. I found well-marked symptoms of pneumonia present. The delirium continued until collapse and unconsciousness set in, the patient dying within twenty-four hours. I am convinced that early systematic treatment in hospital would have saved the life in this case.

The other death was that of Dr. W. A. Murray, Deputy Principal Medical Officer, the cause being blackwater fever. Two points are worthy of notice in connection with this case. First, that it was the second attack of this little understood and treacherous climatic disease.

The first attack occurred about the middle of 1894, more than ten years ago.

The second point worthy of notice is that Dr. Murray had just returned from a trying journey through Ashanti, and I understand he was not very fit in health on arrival in Cape Coast.

The case was not entered as an admission to hospital, as Dr. Murray died in his quarters adjoining the hospital. The remaining European cases admitted to hospital presented an unusually mild type of malarial fever, chiefly remittent, and formed a marked contrast to the severe cases common here some years ago.

EQUIPMENT.

The equipment was fairly satisfactory.

STAFF.

The staff was adequate and efficient for the greater part of the year. The European nurse was taken away from this station in October. There was little work for a nurse during the year.

DISPENSARY.

A total of 2,508 cases were attended at the dispensary, mostly of a trivial nature. The prevalent diseases were:—

- (1) Pulmonary diseases, such as bronchial catarrh.
- (2) Intestinal complaints, such as dysentery, diarrhoea and constipation.
- (3) Rheumatism.
- (4) Affections of the eye.
- (5) Affections of the ear.
- (6) Injuries.

(Signed) P. J. GARLAND,
D.P.M.O.

Report on the Colonial Hospital, Sekondi, for the Year ended December 31, 1904.

During the year the medical duties have been carried out by Dr. Buée and myself, I acting until March 11th, and Dr. Buée from the latter date until September 14th, when I again relieved him, and have continued to act until the present time.

During the year the sanitary duties have been carried on by Drs. Beringer, Le Fanu, and Collier in succession.

EUROPEAN HOSPITAL.

The European hospital consists of two wards. The smaller is used for higher grade officials, and contains four beds. The larger is used for second grade officials, and contains eight beds.

Both wards are well ventilated and comfortable in every respect. The whole hospital is kept clean and in good order, and is in a good state of repair.

NATIVE HOSPITAL.

The Native Hospital is situated at some distance from the European, and is well ventilated, clean, and in good repair.

The hospital is made up of three wards, which are as follows:—

One large ward	...	...	10 beds
Small ward A	...	...	2 "
Small ward B	...	...	2 "
Total	...	...	14 "

Wards "A" and "B" are set apart for native officials, the large ward being allotted to non-official patients.

There are store-rooms, dispensary, operation room, bath-rooms and other usual offices attached to the hospital.

The supply of instruments and drugs is fairly good.

There have been a fair number of minor operations, and several major operations, including amputation, &c., which I am glad to say have been generally successful in result.

The number of patients treated in hospital was as follows:—

In-patients ...	Europeans	...	191	
	Natives (males)	...	121	
	" (females)	...	2	
	Civil Police	...	12	
Total			326	
Out-patients	Europeans	...	0	New cases.
	Natives (males)	...	1,261	
	" (females)	...	81	
	Civil Police	...	132	
Total			1,474	
Out-patients	Europeans	...	0	Old cases.
	Natives (males)	...	2,029	
	" (females)	...	110	
	Civil Police	...	201	
Total			2,340	

There were thirteen European officials invalidated, and two deaths; one from blackwater fever and one from cerebral hæmorrhage.

Amongst the non-officials (European) there were five deaths, only one of these being a permanent resident in Sekondi, the others came in sick from out-lying districts. There were no deaths among the native officials.

Amongst the non-officials (natives) the deaths were as follows:—

Males	...	...	...	...	16
Females	...	...	...	...	1
Civil Police	...	...	...	...	nil
Total	...	...	...	...	17

The number of deaths, including all classes, both Europeans and natives, being summarised as follows:—

Europeans	Officials	...	...	...	2
	Non-officials	...	...	...	5
Natives	Non-officials (males)	...	...	...	16
	Females	...	...	...	1
Total			...	...	24

The majority of cases of illness occurring among the Europeans have been malarial fever of the various types.

REVENUE.

Amount recovered from officials, in-patients (European and native)	...	£228	16	6
In-patients (Civil Police)	...	2	3	6
" (Civil non-officials)	...	110	13	0
Amount paid by dispensary paying patients	...	3	10	0
		£345	3	0

EXPENDITURE.

Expenditure for diets, provisions, fuel, &c., £362 7s. 11d.

The medical staff at present is as follows:—

Medical Officer—W. S. Webb.
Medical Officer of Health—J. H. Collier.
Nursing Sister—A. Wallace.
" " M. Marshall.
Dispenser—F. W. C. Wulff.
Dressers—Four.

The native staff is fairly good. I have always found Mr. Wulff a trustworthy and accurate dispenser.

(Signed) W. S. WEBB,
Medical Officer.

Report on the Colonial Hospital, Adda, for the Year ended December 31, 1904.

I have the honour to forward a Report on the Colonial Hospital at this station, for the year 1904.

I took over the duties of Medical Officer from Dr. Lunn, my predecessor, on February 6th, 1904, since which date I have acted in that capacity.

The buildings consist of a hospital with three wards, a male, a female, and one for Europeans. The

number of beds available for natives are ten, and one for Europeans. There are also two latrine rooms, a dispenser's room, store- and bath-room recesses. The building is completed by one consulting room and dispenser's two living rooms. There are two out-buildings, one being a building composed of a kitchen and three rooms. The hospital is bright, airy, and comfortable, while this, as well as the outbuildings and surroundings, have been kept regularly clean.

ATTENDANCES.

New cases (including 157 paying patients) 1,151, and old cases 1,615. There is a great decrease in the numbers of both new and old cases, and this is the result of the fact that the majority of patients who could afford to pay refused treatment when they are asked to do so.

Fees collected, paying patients during the year, £1 13s. 10d.; average fees charged, 6d. first time, and 1d. each attendance afterwards.

IN-PATIENTS.

There have been forty-two admissions during the year; eight deaths occurred. Two were brought into the hospital in a moribund state, and one died in one hour after admission of fracture of the pelvis, and one, a consumptive, twenty-four hours after admission. The other six died from (1) rupture of the bladder, (2) gunshot wounds, (1) pneumonia, (1) malignant new growth of leg, (1) injury to spine.

There were no major operations, but there were several cases of minor types.

There has been no small-pox, no vaccination performed. One case of diphtheria occurred during the last quarter, out-patient (a child 2 years old) died two days after admission.

(Signed) G. CHARLES WALKER,
Medical Officer.

Report on the Colonial Hospital, Kwitta, for the Year ended December 31, 1904.

BUILDINGS.

The hospital building is a good one. The infectious diseases building is set apart from the hospital, about 100 yards distant. Has not been used this year.

DRUGS, &c.

Drugs and dressings have been sufficient.

IN-PATIENTS.

Sixty-one were treated in the hospital, with five deaths. *Filaria medinensis* caused most admissions.

OUT-PATIENTS.

925 received medicine at the dispensary, mostly paupers. A number came from the outlying villages. Intestinal complaints, skin diseases and injuries were most common. Cases of true tropical diseases are not prominent.

SMALL-POX.

There has been no small-pox, and no vaccination.

(Signed) F. S. HARPER,
Medical Officer.

Report on the Colonial Hospital, Elmina, for the Year ended December 31, 1904.

I have the honour to submit to you the annual report for the medical work carried on at Elmina for the year ending December 31st, 1904.

BUILDINGS.

No alterations have taken place in the buildings during the past year.

The building, &c., is sufficient for the demands made upon it.

WATER SUPPLY.

The supply of water in the tank in the hospital yard is of sufficient quantity to last out the dry season. The quality is good.

DIET, &c.

The diet of the patients has been good both in quality and quantity, the latter being quite liberal.

DRUGS.

The drugs have always been of sufficient quantity to meet all demands.

PATIENTS.

Very few patients have been treated in hospital, and none of those of a dangerous condition, with the exception of a double pneumonia and strangulated hernia.

OPERATIONS.

Since taking over there have been no serious operations, with the exception of one strangulated hernia mentioned in the preceding paragraph.

LATRINES.

The latrines provided are in every way sufficient.

INCOME AND EXPENDITURE.

The income was £7 17s. 9d., and the expenditure was £45 9s. 3d.

(Signed) W. B. THAIN,
Medical Officer.

Report on the Colonial Hospital, Saltpond, for the Year ended December 31, 1904.

During the past year the general health of the Europeans, officials and non-officials has been good. The principal diseases have been malarial fevers and dysentery.

No deaths have occurred, but two non-officials have been invalided, one from remittent fever, by my predecessor in the early part of the year, and the other from blackwater fever, this last December.

During the year there have been 981 new cases and 2,555 subsequent attendances.

Fees to the amount of £8 9s. 6d. have been collected.

Thorough weekly inspections of the town have been made by me since my arrival in July, and the town has been maintained in a good sanitary state.

The scavenging and latrine arrangements have been well carried out under the efficient supervision of the Inspector of Nuisances.

Several water-holes and pools where mosquitoes have been found breeding have been filled up. Many ruined houses have been pulled down, and vacant ground has been fenced in and so kept cleaner.

There has been no small-pox during the year.

The work of the dispensary staff has been entirely satisfactory. I have found Mr. Sutton, the dispenser, invariably most efficient, very willing, and courteous to the patients. Mr. Quansah, the dresser, has also proved most useful, painstaking and trustworthy.

(Signed) ARTHUR E. HORN,
Medical Officer.

APPENDIX II.

Medical Report on Ashanti for the Year 1904.

The health of Kumasi has shown a great improvement during the year 1904, both in the number of officials placed on the sick list and the severity of the attacks of fever.

111 officials were placed on the sick list during the year, and out of that number four were invalided—three to England and one to the Canaries; this latter officer returned and completed his tour. One case of blackwater occurred, and no death took place.

These figures compare very favourably with 1903.

I append comparative list.

INVALIDING.

Four officials were invalided, one to Canary, three to England; both the latter were permanently invalided.

MEDICAL OFFICERS.

Two medical officers have been stationed in Kumasi, and all out-stations have each had the services of one during the year.

SUBORDINATE STAFF.

I am glad to be able to report that Kumasi has had a second dispenser stationed.

MEDICAL STORES.

Good and sufficient for present requirement.

INSTRUMENTS.

Kumasi is fairly well supplied with instruments.

HORSES,

I am glad to say, have shown an improvement, although the death-rate amongst them is still high.

WATER.

European supply good.

Native supply is abundant and good.

QUARTERS FOR EUROPEANS.

Good.

LATRINES.

Pan System.—I understand that 500 pans are on order; this will be of great service to Kumasi in enabling it to be kept in a good sanitary condition.

During the year six latrine houses have been erected in different parts of the town, and are much appreciated by the community.

METEOROLOGICAL CONDITION.

The most remarkable features in the meteorological condition during the year were the heavy rains falling in the months of June and December, as compared with 1903, and the postponing of the Harmattan wind until late in December.

Owing to the short time since merchants have started living here it is difficult to judge as to their health, but so far it has been good.

HEALTH OF NATIVE OFFICIALS

has been good throughout the year. A decided falling off has been shown in the admissions to and attendance at hospital of members of the West African Frontier Force.

OUT-STATIONS.

General Health.—The health of the out-stations in Ashanti has been good throughout the year, with the exception of Odumassi in the north-west of Ashanti; the health at this station has been decidedly bad, two fatal cases of blackwater occurring; and one official was unable to complete his tour of service owing to chronic malaria. The health of the other officials has not been satisfactory.

KUMASI.

Average Official Population	No. placed on Sick List	No. of Cases Blackwater Fever	NUMBER	
			Invalided	Died
25	1904. 111+	1	4*	—
25	1903. 150	1	8†	1

OUT-STATIONS.

	1904.			
Odumassi, 3 ..	30	2	1	2
Mampon, 3 ..	6	1	1	—
Kwissa, 3 ..	9	1(mild)	—	—
Obuassi, 3 ..	15	—	—	—

* Invalided to Canary, returned to Colony and completed tour.

† Out of this number 13 suffered from ptomaine poisoning due to bad tinned food.

‡ Invalided to the Islands; died at Canary.

(Signed) H. TWEEDY,
Senior Medical Officer.

APPENDIX III.

Medical Report, Northern Territories, for the Year 1904.

NORTHERN TERRITORIES.

The Northern Territories are divided for administrative purposes into four districts, the White Volta District, the Black Volta District, the Gonja District, and the Kintampo District, and at the headquarters of each district a medical department is maintained. During the early part of this year the headquarters of the Gonja District was removed from the town of Salaga to that of Yegi.

Colonial Medical Reports.—No. 20.—The Gold Coast—
(continued).

Yegi lies close to the River Volta, about one day's journey from Salaga.

In the six months for which statistics are available the health of all ranks at Yegi has been very inferior to that at Salaga, but too short a period has elapsed since the change to warrant any generalisation from the facts collected.

The following table shows the total number of all ranks who served in the Northern Territories in 1904:—

European Officials	Native Officials	Gold Coast Regiment	Station Carriers
46	29	573	375

HEALTH—EUROPEANS.

All important variations in the health of the European officials are shown in Table A.

They suffered from the following diseases:—

Diarrhoea	2 cases.
Gastritis	1 „
Hæmoglobinuric fever	2 „
Intermittent malarial fever	17 „
Remittent malarial fever	40 „
Renal colic	1 „
Vomiting (at Wa) (symptom only)	1 „

Thus of a total of 64 cases of illness 59 were of malarial origin.

INVALIDING.

Two European officials were invalided during the year after recovery from hæmoglobinuric fever.

DEATHS.

No deaths of Europeans were recorded. A military officer who left Gambaga, having completed over a year's service, died of hæmoglobinuric fever shortly after landing in England.

THE AGE AVERAGE OF OFFICERS.

Officers under 30 years appear to suffer more severely from disease than those above that age. Unfortunately the age average is decreasing. At the beginning of the year, at Gambaga, it was between 30 and 40 years, but in the latter part of the year it fell to between 20 and 30 years.

A similar decrease is, I believe, common to other stations.

THE NATIVE OFFICIAL.

Health.—All important variations in health are shown in Table B.

They suffered from the following diseases:—

Continued fever	5 cases.
Abscess	2 „
Bronchitis	1 „
Abscess of liver	1 „
Constipation	1 „
Diarrhoea	1 „
Tonsillitis	1 „
Injury	1 „

Of 29 native officials serving, 11 were admitted to the sick list during the year.

Invalided: There was no invaliding.

Death: There was no death.

The native official is really a stranger in the Northern Territories, where his mode of life is not that of the Coast town he comes from.

His food also differs greatly from that he is accustomed to at home, on account of the complete absence of plantain, or Koko Yam, from the Northern Territories dietary.

It will be observed, notwithstanding, that he enjoys excellent health, and that his ailments are usually of trifling importance.

GOLD COAST REGIMENT.

All important variations in the health of the Gold Coast Regiment, 2nd Battalion, are shown in Table C. The men suffered chiefly from the diseases arranged below, in the order of frequency:—

Guinea-worm, continued fever, injuries, constipation, bronchitis, gonorrhœa, syphilis, rheumatism.

Invaliding: Eight men were invalided as unfit for military service, suffering from syphilis, gonorrhœa, cardiac disease, necrosis of bone.

Deaths: Seven deaths occurred during the year from the causes stated below:—

Pneumonia	4 cases.
Epistaxis	1 „
Pyæmia	1 „
Intestinal obstruction	1 „

STATION CARRIERS.

All important variations in the health of the station carriers are shown in Table D.

They suffered chiefly from the following diseases arranged below in the order of frequency:—

Constipation, guinea-worm, injuries, bronchitis, rheumatism, diarrhoea, remittent fever, gonorrhœa, syphilis.

Invalided: Twenty men were invalided as unfit for work from syphilis, phagedæna, hernia.

Deaths: Two deaths took place, one from cirrhosis of the liver and one from pneumonia.

TOWNSFOLK.

A total of 1,247 persons were treated at the five dispensaries during 1904.

These persons represented all grades of native society from the towns and villages near the dispensaries. They suffered chiefly from the following diseases, arranged in order of frequency:—

Ulcers, injuries, bronchitis, constipation, ringworm, conjunctivitis, syphilis, guinea-worm, yaws, rheumatism, gonorrhœa.

SANITATION.

The control of the sanitary arrangements is in the hands of the Medical Officer.

There is one Inspector of Nuisances at Gambaga.

LATRINES.

Pan latrines are supplied for the use of European officials, and the pans are emptied twice a day by prison labour. Pit latrines are supplied for the use of

the native population. The latrines are dug and kept in good order by prison labour.

Rubbish heaps are formed at suitable places chosen by the Medical Officer, and the heaps are burned weekly.

SLAUGHTER HOUSES.

All animals to be slaughtered for use as food are daily examined by the medical officer, who has the power to veto the slaughter of those he may consider unfit.

INFECTIOUS DISEASE.

No epidemic of grave infectious nature has occurred during the year.

A mild epidemic of chicken-pox occurred at Wa.

An epidemic of mumps has prevailed at Gambaga for the past three months.

No cases of small-pox were recorded.

THE MEDICAL DEPARTMENT.

The medical establishment in the Northern Territories consisted of:—

- 1 Senior Medical Officer.
- 4 Medical Officers.
- 1 Dispenser.
- 4 Dressers.

HOSPITALS.

Gambaga.—There is an excellent hospital of ten beds, with operation room, consulting room, dispensary, store, mortuary, kitchen and quarters for the dispenser and dresser.

There is an isolation hospital for infectious diseases. 299 cases were treated in 1904.

Kintampo.—There is a hospital of three beds, with dispensary, store and quarters for the dresser.

Forty-five cases were treated in 1904.

Salaga.—There is a hospital of eight beds, with dispensary and store.

353 case were treated in 1904.

Yegi.—The erection of a hospital will be begun next year. A dispensary and store have been already built.

Three cases treated (in the store) in 1904.

Wa.—There is a hospital, with dispensary, store, kitchen and dresser's quarters.

Ninety-one cases treated in 1904.

METEOROLOGY.

The meteorological station for the Northern Territories is situated at Gambaga.

It is supplied with the following instruments:—

Solar maximum thermometer.

Shade maximum "

Shade minimum "

Dry bulb "

Wet bulb "

Rain guage.

From Table E it will be seen:—

- (1) That the rainfall amounted to 40·51 inches.
- (2) That the rainfall occurred in seven months, from April to October inclusive.
- (3) That there were five rainless months.
- (4) That the average humidity varied almost directly as the rainfall.
- (5) That the average minimum temperature approximately corresponded to the average dew point during the rains only.
- (6) That during the rainless months there was no dew.

The rainfall for the last three years was:—

1902	...	...	...	31·59 inches.
1903	...	...	...	43·03 "
1904	...	...	...	40·51 "

(Sgd.) W. M. GRAHAM,

Ag. S.M.O.,

Gambaga, Northern Territories.

TABLE A.

MEDICAL STATISTICS RELATING TO EUROPEAN OFFICIALS SERVING IN THE NORTHERN TERRITORIES, 1904.

1904	GAMBAGA					KINTAMPO					SALAGA					YEGI					WA				
	Average Strength	Sick	Number of days on the Sick List	Invalid	Died	Average Strength	Sick	Number of days on the Sick List	Invalid	Died	Average Strength	Sick	Number of days on the Sick List	Invalid	Died	Average Strength	Sick	Number of days on the Sick List	Invalid	Died	Average Strength	Sick	Number of days on the Sick List	Invalid	Died
January	12·0	2	5	0	0	4	0	0	0	0	4	1	4	0	0	—	—	—	—	—	7	2	7	0	0
February	12·7	1	4	0	0	5	0	0	0	0	4	2	4	0	0	—	—	—	—	—	4	0	0	0	0
March ..	11·4	1	2	0	0	8	5	27	0	0	5	2	5	0	0	—	—	—	—	—	4	0	0	0	0
April ..	11·6	1	4	0	0	7	1	7	0	0	4	0	0	0	0	—	—	—	—	—	4	0	0	0	0
May ..	10·2	0	0	0	0	6	0	0	0	0	2	1	2	0	0	—	—	—	—	—	3	0	0	0	0
June ..	10·4	2	8	0	0	4	0	0	0	0	2	0	0	0	0	2	1	4	0	0	3	2	14	0	0
July ..	9·4	0	0	0	0	4	0	0	0	0	1	0	0	0	0	2	2	8	0	0	3	1	10	0	0
August ..	9·3	3	7	0	0	4	0	0	0	0	1	0	0	0	0	2	1	4	0	0	3	2	11	0	0
September ..	9·2	1	7	0	0	4	1	2	0	0	1	1	3	0	0	2	1	8	0	0	4	2	6	0	0
October ..	9·3	4	29	0	0	4	2	3	0	0	1	1	5	0	0	2	2	9	1	0	6	2	17	0	0
November ..	8·5	2	29	0	0	4	0	0	0	0	1	0	0	0	0	2	2	3	0	0	6	1	4	0	0
December	8·1	5	18	1	0	4·6	0	0	0	0	1	0	0	0	0	2	2	10	0	0	4	2	8	0	0
Totals..	122·1	22	113	1	0	58·6	9	39	0	0	27	8	23	0	0	14	11	46	1	0	51	14	77	0	0

TABLE B.

MEDICAL STATISTICS RELATING TO NATIVE OFFICIALS SERVING IN THE NORTHERN TERRITORIES, 1904.

1904	GAMBAGA					KINTAMPO					SALAGA					YEOT					WA				
	Strength	Sick	Number of days on the Sick List	Invalided	Died	Strength	Sick	Number of days on the Sick List	Invalided	Died	Strength	Sick	Number of days on the Sick List	Invalided	Died	Strength	Sick	Number of days on the Sick List	Invalided	Died	Strength	Sick	Number of days on the Sick List	Invalided	Died
January	6.0	0	0	0	0	5	2	4	0	0	2	0	0	0	0	—	—	—	—	—	4	0	0	0	0
February	6.0	0	0	0	0	5	0	0	0	0	2	2	10	0	0	—	—	—	—	—	4	0	0	0	0
March ..	6.5	1	4	0	0	5	0	0	0	0	2	0	0	0	0	—	—	—	—	—	3	0	0	0	0
April ..	6.1	0	0	0	0	5	0	0	0	0	3	1	4	0	0	—	—	—	—	—	3	0	5	0	0
May ..	6.9	0	0	0	0	5	0	0	0	0	3	1	31	0	0	—	—	—	—	—	3	1	0	0	0
June ..	5.0	1	2	0	0	5	0	0	0	0	2	0	0	0	0	1	1	4	0	0	3	0	0	0	0
July ..	5.0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	3	2	19	0	0	3	0	0	0	0
August ..	5.9	0	0	0	0	5	0	0	0	0	1	0	0	0	0	2	0	0	0	0	3	0	0	0	0
September	6.0	0	0	0	0	5	1	7	0	0	1	1	15	0	0	2	1	4	0	0	4	0	0	0	0
October...	6.0	0	0	0	0	5	0	0	0	0	1	1	7	0	0	2	1	3	0	0	3	1	19	0	0
November	6.5	0	0	0	0	5	0	0	0	0	1	0	0	0	0	2	1	2	0	0	3	1	2	0	0
December	6.9	0	0	0	0	5	0	0	0	0	1	0	0	0	0	2	0	0	0	0	3	0	0	0	0
Totals..	72.8	2	6	0	0	60	3	11	0	0	19	6	67	0	0	14	6	32	0	0	39	3	26	0	0

TABLE C.

MEDICAL STATISTICS RELATING TO THE 2ND BATTALION GOLD COAST REGIMENT SERVING IN NORTHERN TERRITORIES, 1904.

1904	GAMBAGA				KINTAMPO				SALAGA				YEOT				WA			
	Strength	Sick	Invalided	Died	Strength	Sick	Invalided	Died	Strength	Sick	Invalided	Died	Strength	Sick	Invalided	Died	Strength	Sick	Invalided	Died
January..	309	34	0	0	82	46	0	0	46	10	0	0	—	—	—	—	181	21	0	0
February ..	429	53	1	0	80	32	0	0	46	9	0	0	—	—	—	—	181	19	0	0
March ..	327	46	0	1	88	51	0	0	46	13	0	0	—	—	—	—	95	20	0	0
April ..	364	42	1	0	91	23	0	0	46	17	0	0	—	—	—	—	95	13	0	0
May ..	317	66	0	1	90	20	0	1	46	12	0	0	—	—	—	—	95	21	0	1
June ..	364	80	2	1	90	18	0	0	27	6	0	0	10	1	0	0	95	14	0	0
July ..	370	100	0	0	79	14	0	0	7	1	0	0	39	13	0	0	84	9	1	0
August ..	370	128	1	0	79	12	2	0	14	3	0	0	28	8	0	0	84	7	0	0
September	368	89	3	0	79	14	0	0	21	4	0	0	18	3	0	0	84	11	0	0
October ..	370	76	4	1	64	17	0	0	25	3	0	0	32	12	0	0	84	10	0	1
November	327	74	1	0	53	16	0	0	23	3	0	0	45	45	1	0	83	11	0	0
December	326	106	0	0	61	13	0	0	23	5	0	0	40	11	1	0	83	13	0	0
Totals..	4,241	894	13	4	936	276	2	1	370	86	0	0	212	93	2	0	244	169	1	2

TABLE D.
MEDICAL STATISTICS RELATING TO STATION CARRIERS SERVING IN THE NORTHERN TERRITORIES, 1904.

1904	GAMBAGA				KINTAMPO				SALAGA				YEGI				WA			
	Strength	Sick	Invalid	Died	Strength	Sick	Invalid	Died	Strength	Sick	Invalid	Died	Strength	Sick	Invalid	Died	Strength	Sick	Invalid	Died
January..	150	24	—	—	56	37	—	—	75	7	—	—	—	—	—	—	19	3	—	—
February..	140	30	1	—	50	42	—	—	75	8	—	—	—	—	—	—	19	2	—	—
March..	165	40	1	—	51	44	—	—	75	9	—	—	—	—	—	—	19	1	—	—
April..	147	32	12	—	57	11	—	—	75	4	—	—	—	—	—	—	25	5	—	—
May..	183	15	—	—	80	26	—	—	65	3	—	—	—	—	—	—	25	8	—	—
June..	136	21	—	—	50	23	—	—	46	2	—	—	50	1	—	—	25	3	—	—
July..	102	47	—	—	50	13	—	—	12	3	—	—	35	19	—	—	25	7	—	—
August..	129	36	1	1	50	7	—	—	12	5	—	—	40	14	—	—	25	4	—	—
September..	126	31	2	—	50	10	—	—	12	2	—	—	57	34	2	—	25	6	—	—
October..	123	31	—	—	42	17	—	—	12	4	—	—	59	34	—	—	25	7	—	—
November..	124	23	—	—	41	21	—	—	12	2	—	—	71	13	—	—	25	7	—	—
December..	123	22	—	—	47	39	—	—	18	7	—	—	51	22	1	1	31	6	—	—
Totals..	1,598	352	17	1	624	290	—	—	489	56	—	—	363	137	3	1	288	59	—	—

TABLE E.
MONTHLY AVERAGES OF DAILY METEOROLOGICAL OBSERVATIONS AT GAMBAGA, NORTHERN TERRITORIES, 1904.

1904	Average Solar Maximum	Average Shade Maximum	Average Shade Minimum	Average Dewpoint	Average Relative Humidity	Average Extreme Daily Range	The Total Rainfall	Remarks
January..	143.35	92.32	69.74	50.23	34.54	22.90	0.00	(1) The season of the rains is preceded and closed by thunderstorms accompanied by violent gales of wind.
February..	147.03	92.75	70.41	48.65	30.48	22.34	0.00	
March..	154.09	95.41	75.67	58.30	32.70	19.74	0.61	
April..	151.50	93.76	73.48	59.08	46.66	18.33	1.74	
May..	146.00	85.38	72.82	64.26	57.80	12.51	6.65	
June..	153.23	84.73	69.86	66.66	71.00	14.86	3.19	(2) Hail fell once in May and once in June.
July..	139.96	79.03	69.90	70.24	83.67	9.19	10.01	
August..	144.00	79.61	71.38	70.36	82.77	8.22	7.25	(3) Early in December the wind changed to N.E., and the so-called Harmattan season began.
September..	153.26	80.50	70.20	70.80	79.26	10.30	7.97	
October..	150.29	83.00	71.29	71.88	77.64	11.70	3.09	(4) During the season a strong breeze usually prevails day and night.
November..	148.50	90.00	71.66	68.63	56.26	18.33	0.00	
December..	143.80	90.38	69.35	57.60	41.00	21.03	0.00	

(5) The total annual rainfall was 40.51 inches.

Colonial Medical Reports.—No. 20.—THE GOLD COAST (*continued*).RETURN OF DISEASES AND DEATHS IN 1904, AT THE
Government Hospitals at Accra, Cape Coast, Elmina, Axim, Kwitta, and Kumasi.

GENERAL DISEASES.				GENERAL DISEASES— <i>continued</i> .			
	Admis- sions.	Deaths.	Total Cases Treated.		Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism	5	—	5	Other Tubercular Diseases	—	—	—
Anæmia	1	—	1	Varicella	—	—	—
Anthrax	—	—	—	Whooping Cough	—	—	—
Beri-beri	8	2	8	Yaws	6	—	6
Bilharziosis	—	—	—	Yellow Fever	—	—	—
Blackwater Fever	—	—	—				
Chicken-pox	—	—	—				
Cholera	—	—	—				
Choleraic Diarrhoea	—	—	—				
Congenital Malformation	—	—	—				
Debility	21	2	21				
Delirium Tremens	3	—	3				
Dengue	—	—	—				
Diabetes Mellitus	—	—	—				
Diabetes Insipidus	—	—	—				
Diphtheria	—	—	—				
Dysentery	82	23	82				
Enteric Fever	1	—	1				
Erysipelas	3	2	3				
Febricula	10	—	10				
Filariasis	—	—	—				
Gonorrhœa	18	—	19				
Gout	—	—	—				
Hydrophobia	—	—	—				
Influenza	2	—	2				
Kala-Azar	—	—	—				
Leprosy	—	—	—				
(a) Nodular	—	—	—				
(b) Anæsthetic	—	—	—				
(c) Mixed	—	—	—				
Malarial Fever—							
(a) Intermittent—							
Quotidian	17	—	17				
Tertian	—	—	—				
Quartan	162	—	162				
Irregular	1	—	3				
Type undiagnosed	55	—	55				
(b) Remittent	237	6	241				
(c) Pernicious	15	3	15				
(d) Malarial Cachexia	—	—	—				
Malta Fever	—	—	—				
Measles	16	—	17				
Mumps	—	—	—				
New Growths—							
Non-malignant	6	—	6				
Malignant	2	1	2				
Old Age	—	—	—				
Other Diseases	—	—	—				
Pellagra	—	—	—				
Plague	—	—	—				
Pyæmia	—	—	—				
Rachitis	—	—	—				
Rheumatic Fever	1	—	1				
Rheumatism	60	—	63				
Rheumatoid Arthritis	—	—	—				
Scarlet Fever	—	—	—				
Scurvy	—	—	—				
Septicæmia	1	—	1				
Sleeping Sickness	—	—	—				
Sloughing Phagedæna	—	—	—				
Small-pox	59	1	62				
Syphilis—							
(a) Primary	8	—	8				
(b) Secondary	9	—	10				
(c) Tertiary	—	—	—				
(d) Congenital	—	—	—				
Tetanus	3	2	3				
Trypanosoma Fever	—	—	—				
Tubercle—							
(a) Phthisis Pulmonalis	—	—	—				
(b) Tuberculosis of Glands	—	—	—				
(c) Lupus	—	—	—				
(d) Tabes Mesenterica	—	—	—				
(e) Tuberculous Disease of Bones	—	—	—				

LOCAL DISEASES.

Diseases of the—			
Cellular Tissue	75	2	78
Circulatory System—			
(a) Valvular Disease of Heart	5	2	5
(b) Other Diseases	14	7	14
Digestive System—			
(a) Diarrhoea	34	1	34
(b) Hill Diarrhoea	—	—	—
(c) Hepatitis	—	—	—
Congestion of Liver	5	—	5
(d) Abscess of Liver	12	2	12
(e) Tropical Liver	—	—	—
(f) Jaundice, Catarrhal	2	1	2
(g) Cirrhosis of Liver	—	—	—
(h) Acute Yellow Atrophy	—	—	—
(i) Sprue	—	—	—
(j) Other Diseases	180	9	183
Ear	2	—	2
Eye	26	—	26
Generative System—			
Male Organs	30	1	32
Female Organs	4	—	4
Lymphatic System	28	—	29
Nervous System	54	19	56
Nose	3	—	3
Organs of Locomotion	33	—	33
Respiratory System	158	25	162
Skin—			
(a) Scabies	3	—	3
(b) Ringworm	—	—	—
(c) Tinea Imbricata	—	—	—
(d) Favus	—	—	—
(e) Eczema	1	—	1
(f) Other Diseases	132	1	137
Urinary System	14	2	15
Injuries, General, Local—			
(a) Siriasis (Heatstroke)	—	—	—
(b) Sunstroke (Heat Prostration)	5	1	5
(c) Other Injuries	209	5	210
Parasites—			
Ascaris lumbricoides	—	—	—
Oxyuris vermicularis	—	—	—
Dochmius duodenalis, or Ankylos- toma duodenale	—	—	—
Dracunculus medinensis (Guinea- worm)	64	—	64
Tape-worm	—	—	—
Poisons—			
Snake-bites	2	—	2
Corrosive Acids	—	—	—
Metallic Poisons	—	—	—
Vegetable Alkaloids	—	—	—
Nature Unknown	—	—	—
Other Poisons	2	2	2
Surgical Operations—			
Amputations, Major	12	1	12
Minor	—	—	—
Other Operations	26	4	26
Eye	—	—	—
(a) Cataract	—	—	—
(b) Iridectomy	—	—	—
(c) Other Eye Operations	—	—	—

APPENDIX V.

ACCRA.

METEOROLOGICAL RETURN FOR THE YEAR 1904.

Month	TEMPERATURE						RAINFALL		WIND		Remarks
	Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	134.90	70.74	87.51	71.41	15.09	79.46	..	80.03	..	12	
February	139.20	73.20	87.37	73.16	13.17	80.26	.21	80.38	..	16	
March	143.90	74.54	86.61	74.41	12.12	80.51	.26	80.87	..	15.4	
April	145.26	72.33	87.03	75.36	12.33	81.19	1.83	73.90	..	15.4	
May	145.83	69.03	89.06	75.93	10.54	82.49	3.90	77.32	..	14	
June	142.23	63.70	84.40	74.36	10.06	79.38	8.97	85.66	..	18	
July	138.25	62.87	79.38	72.54	6.83	75.96	1.61	92.00	..	19	
August	131.32	69.12	77.90	72.25	5.64	75.07	..	87.93	..	19.4	
September	141.53	66.45	81.50	71.43	10.06	76.46	..	82.40	..	18.4	
October	145.16	67.16	83.32	71.74	11.58	77.53	.46	74.25	..	12.4	
November	143.63	82.86	86.96	71.96	14.99	79.46	.2	70.13	..	13	
December	137.51	81.12	87.00	71.67	15.32	79.33	.2	75.00	..	13	
Totals	1688.72	853.03	1018.04	876.22	137.73	947.10	17.28	959.87	..	186	
Mean	140.72	71.04	84.83	73.01	11.47	78.92	1.44	79.98	..	15.5	

ABURI.

METEOROLOGICAL RETURN FOR THE YEAR 1904.

Month	TEMPERATURE						RAINFALL		WIND		Remarks
	Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	118.38	73.77	85.25	82.09	3.16	83.67	.1	82.35	N.W.	..	
February	121.17	72.79	84.06	74.13	9.92	79.09	.55	82.27	N.W.	..	
March	119.67	69.80	78.77	71.93	6.83	75.35	4.16	84.14	N.W.	..	
April	133.43	69.30	88.73	79.33	9.40	84.03	1.84	76.18	..	..
May	124.48	65.19	82.67	73.70	9.29	78.18	6.24	80.41	..	..
June	120.80	69.04	76.02	68.00	8.13	72.01	6.47	82.20	N.W.	..	
July	122.06	99.09	72.87	65.61	7.25	69.24	2.19	85.53	N.W.	..	
August	125.22	70.51	77.67	69.12	8.54	73.93	.65	83.79	N.W.	..	
September	132.76	69.63	78.60	67.53	11.06	73.06	2.97	85.83	N.W.	..	
October	136.16	71.58	79.51	69.38	10.12	74.44	2.20	84.40	N.W.	..	
November	125.73	75.90	81.56	71.63	9.63	76.59	.52	83.51	N.W.	..	
December	133.41	74.64	75.32	70.00	6.32	73.16	3.30	87.72	..	..
Totals	1513.27	881.54	972.03	862.45	99.65	912.75	31.10	998.33	..	..
Mean	126.10	73.46	81.00	71.87	8.30	76.06	2.59	83.19	..	..

AXIM.

METEOROLOGICAL RETURN FOR THE YEAR 1904.

Month	TEMPERATURE						RAINFALL		WIND		Remarks
	Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	129.74	54.22	87.90	68.38	19.45	78.14	.98	83.74	..	..
February	130.68	50.96	89.24	68.65	23.68	78.94	1.07	79.75	..	..
March	163.80	52.12	87.74	72.92	14.88	80.33	8.50	85.48	..	..
April	127.90	39.46	87.46	71.96	15.83	79.71	5.63	82.76	..	..
May	121.58	34.58	86.29	71.12	15.16	78.70	14.46	82.77	..	..
June	121.90	31.24	82.60	71.13	11.46	76.86	32.57	87.93	..	..
July	122.38	30.16	80.29	70.48	9.80	75.38	.71	84.35	..	..
August	117.16	24.41	78.51	67.70	10.80	73.10	.75	92.80	..	..
September	129.43	25.02	81.10	69.53	11.56	73.31	1.11	90.50	..	..
October	129.45	24.53	82.12	70.80	11.32	76.46	2.56	89.19	..	..
November	129.16	..	85.33	70.93	14.56	78.13	2.99	84.60	..	..
December	129.64	..	85.80	74.48	11.32	80.14	3.76	80.58	..	..
Totals	1551.82	366.70	1014.38	848.08	169.42	929.20	75.09	1024.45	..	..
Mean	129.31	36.67	81.53	70.67	14.11	77.43	6.25	85.37	..	..

CAPE COAST.

METEOROLOGICAL RETURN FOR THE YEAR 1904.

Month	TEMPERATURE						RAINFALL		WIND		Remarks
	Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	69.90	85.70	70.87	14.83	78.28	.48	85.88	..	..
February	69.82	86.55	72.62	13.93	79.58	1.30	77.90	..	..
March	71.32	86.61	72.93	13.67	79.77	3.23	79.66	..	..
April	73.00	86.66	73.33	13.33	79.99	2.15	84.13	..	..
May	72.32	85.90	72.41	13.48	79.15	6.24	80.64	..	..
June	71.03	82.90	70.80	4.19	76.85	4.19	86.83	..	..
July	70.29	80.93	70.90	10.03	75.91	.60	90.58	..	..
August	68.70	79.09	69.03	10.06	74.06	.79	90.11	..	..
September	70.43	80.36	70.66	11.03	75.51	.12	87.53	..	..
October	72.19	82.00	71.83	10.22	76.91	1.20	87.08	..	..
November	73.93	84.83	73.53	11.50	79.18	2.63	80.16	..	..
December	73.38	85.83	73.77	12.06	79.80	.4	81.25	..	..
Totals	856.31	1007.36	862.68	138.33	934.99	22.97	1011.15	..	..
Mean	71.35	83.94	71.89	11.52	77.91	1.91	84.26	..	..

KWITTA.

METEOROLOGICAL RETURN FOR THE YEAR 1904.

Month	TEMPERATURE						RAINFALL		WIND		Remarks
	Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	134.09	69.48	90.96	79.25	10.83	85.10	..	75.33	..	..
February	136.48	74.72	89.62	77.68	11.93	83.65	.10	72.68	..	..
March	142.83	75.00	88.93	77.09	11.83	83.01	.8	73.70	..	..
April	142.00	75.06	89.06	78.40	10.66	83.73	2.11	70.85	..	..
May	142.80	73.48	89.45	76.70	12.74	83.07	1.72	68.40	..	..
June	140.46	73.43	89.06	75.60	13.80	82.33	8.26	77.75	..	..
July	140.06	72.58	88.77	75.70	13.06	82.23	.54	74.67	..	..
August	135.22	70.54	87.45	73.96	13.48	80.72	.17	81.77	..	..
September	143.36	71.73	88.00	75.03	12.96	81.51	.52	76.11	..	..
October	142.00	75.87	88.58	76.41	12.16	82.49	.14	74.00	..	..
November	147.00	75.06	88.00	77.40	10.53	82.70	..	76.91	..	..
December	140.03	75.87	87.38	74.67	12.74	81.02	1.76	79.29	..	..
Totals	1686.33	882.82	1065.26	917.89	146.72	991.56	15.40	901.46	..	..
Mean	140.52	73.56	88.77	76.49	12.22	82.63	1.54	75.12	..	..

KUMASI.

METEOROLOGICAL RETURN FOR THE YEAR 1904.

Month	TEMPERATURE						RAINFALL		WIND		Remarks
	Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	134.45	..	85.22	63.54	21.64	74.38	.70	72.00	..	..
February	175.24	..	94.68	65.79	22.62	80.23	.02	73.65	..	..
March	148.03	..	90.15	70.93	18.88	80.54	3.64	78.25	..	..
April	140.93	..	..	71.10	..	..	4.22	79.76	..	..
May	145.22	67.45	..	70.41	..	..	4.78	85.54	..	..
June	140.03	70.56	84.36	72.63	12.66	78.49	10.10	89.30	..	..
July	129.09	68.41	79.67	70.22	9.45	74.94	3.60	88.67	..	..
August	127.74	68.54	79.58	69.83	10.00	74.10	.42	83.03	..	..
September	170.43	69.53	82.63	71.10	11.80	76.86	2.62	84.93	..	..
October	151.22	65.67	80.96	71.45	12.22	76.20	5.43	92.90	..	..
November	149.50	69.86	86.23	71.36	14.86	78.79	1.38	86.00	..	..
December	140.80	66.41	84.70	68.41	16.29	76.55	2.84	82.23	..	..
Totals	1752.68	550.43	848.18	836.77	150.42	771.08	39.75	996.25	..	..
Mean	146.05	68.80	84.81	69.73	15.04	77.10	3.31	83.02	..	..

Colonial Medical Reports.—No. 20.—The Gold Coast (*continued*).

GAMBAGA.

METEOROLOGICAL RETURN FOR THE YEAR 1904.

Month	TEMPERATURE						RAINFALL		WIND		Remarks
	Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	143·35	59·29	92·32	69·74	22·90	81·03	..	34·54	..	..
February	147·03	51·86	92·75	70·41	22·34	81·58	..	30·48	..	..
March	154·09	42·43	95·41	75·67	19·74	85·54	·61	32·70	..	..
April	151·50	..	93·76	73·48	18·33	83·57	1·74	46·66	..	..
May	146·00	..	85·38	72·82	12·51	79·10	6·65	57·80	..	..
June	153·23	..	84·73	69·86	14·86	77·29	3·19	71·00	..	..
July	139·96	..	79·03	69·90	9·19	74·46	10·01	83·67	..	..
August	144·00	..	79·61	71·38	8·22	75·49	7·25	83·77	..	..
September	153·26	..	80·50	70·20	10·30	75·35	7·97	79·26	..	..
October	150·29	..	83·00	71·29	11·70	77·14	3·09	77·64	..	..
November	148·50	..	90·00	71·66	18·33	80·83	..	56·26	..	..
December	143·80	..	90·38	69·35	21·03	79·86	..	41·00	..	..
Totals	1775·01	153·58	1046·87	895·76	189·45	951·24	40·51	693·78	..	..
Mean	147·91	51·19	87·23	74·64	15·78	79·27	5·06	57·81	..	..

Colonial Medical Reports.—No. 21.—The Straits Settlements.

MEDICAL REPORT FOR THE YEAR 1904.

By Dr. D. K. McDOWELL, C.M.G.

Principal Civil Medical Officer, Straits Settlements.

POPULATION AND HEALTH.

(1) The following table shows the estimated population and the birth and death-rates for the years 1903 and 1904 for the several Settlements.

(2) The death-rate for the whole of the Colony was 39 in 1904 as against 39·49 in 1903 and 42·96 in 1902, and judging from this there seems to have been an improvement in the public health of the Colony in 1904 over the two previous years.

Settlement	Estimated mean Population		Births		Deaths		Birth Ratio per Mille.		Death Ratio per Mille.	
	1903	1904	1903	1904	1903	1904	1903	1904	1903	1904
Singapore	240,833	246,495	5,089	5,435	11,505	10,937	21·13	22·05	47·77	44·37
Penang	130,121	130,602	2,495	2,493	4,988	5,517	19·17	19·08	38·33	42·24
Dindings	4,236	4,294	136	158	137	128	32·10	36·79	32·34	29·80
Province Wellesley	117,078	117,762	3,813	3,778	3,279	3,392	32·57	32·08	28·01	28·80
Malacca	96,276	96,629	3,976	3,380	3,332	3,259	41·30	34·97	34·61	33·73
Total	588,544	595,782	15,509	15,244	23,241	23,233	26·35	25·59	39·49	39·

From this table it will be seen that there was a considerable reduction in the number of births in Malacca in 1904 as compared with 1903. Singapore, however, shows an increase in the birth-rate and an appreciable reduction in the death-rate, a result which was also obtained in 1903 as compared with 1902.

(3) Of the total number of deaths registered in 1904, 3,841 were among infants of under one year old, against 3,865 in 1903, and 3,631 in 1902. Of the total deaths registered in Singapore in 1904, 284 were among persons who had resided less than one month in the Settlement.

(5) *Beri-beri*.—Two thousand six hundred and thirty-one cases were admitted into hospital with 879 deaths in 1904, as against 1,919 cases with 647 deaths in 1903, and 1,901 cases with 575 deaths in 1902. The total number of deaths registered in 1904, 1903 and 1902 respectively, were 2,287, 1,729, and 1,607. It will be seen, therefore, that this disease has a tendency to increase. Five cases of beri-beri occurred in the General Hospital and 60 in the Tan Tock Seng's Hospital among patients admitted for other diseases. There were 266 cases of beri-beri in the Singapore Prison as against 169 in 1903, but the

	PLAGUE				CHOLERA				SMALL-POX			
	1903		1904		1903		1904		1903		1904	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Singapore	3	3	20	20	226	190	3	3	109	29	33	11
Penang .. ..	..	..	..	..	..	..	..	..	227	57	3	2
Province Wellesley ..	..	..	..	..	..	..	..	..	258	49	6	2
Malacca .. ..	..	..	..	..	..	..	..	..	266	40	100	7
Total	3	3	20	20	226	190	3	3	860	175	142	22

(4) The above table gives the number of cases of zymotic diseases in the several Settlements in the years 1903 and 1904, and deaths therefrom, not including cases imported into the Colony.

Plague.—The 20 cases in Singapore in 1904 all proved fatal. They occurred in different parts of the town among 17 Chinese and 3 Tamils. Two of the cases were said to be among late arrivals in Singapore, but this could not be definitely ascertained.

Cholera.—Only 3 cases, all fatal, were reported in Singapore, one occurring in the prison. There were none in the other Settlements.

Small-pox.—One hundred and forty-two cases with 22 deaths were reported in all the Settlements, being a great decrease over the figures for 1903.

Enteric Fever.—This, I am afraid, is on the increase. One hundred and seventy-nine cases with 69 deaths were reported in Singapore, as against 148 cases and 47 deaths in the year previous. One hundred and seventy-three cases were treated in hospitals in the several Settlements. Of these 75 died. Three cases occurred in the Singapore Prison.

Diphtheria.—Seventeen cases were reported in Singapore with 9 deaths.

percentage of deaths was lower in 1904. Following the good result of former years 30 prisoners with beri-beri were transferred to Malacca from Singapore, but the result was not satisfactory.

(6) *Veneral Diseases*.—The admissions to all the hospitals for 1904 numbered 1,784, with 95 deaths. In 1903 there were 1,818 admissions, with 96 deaths, and in 1902, 2,341 admissions, with 90 deaths. Of those admitted in 1904, 237 were females, of whom 152 were prostitutes.

(7) Owing to the overcrowding and bad sanitation phthisis is very much on the increase, 1,644 deaths have been registered in Singapore alone, or 2,534 for the Colony.

(8) *Sanitation*.—With the continued overcrowding in Singapore the sanitation cannot be said to be in a satisfactory state. There is practically no sewerage system. The drainage in many places is bad, and the water supply is being constantly cut off. The time has come, I think, when the question of remedying these defects should be seriously considered by the authorities concerned. The want of a good and plentiful water supply is undoubtedly one of the chief causes of the high mortality rate. In

	NUMBER OF PATIENTS TREATED			NUMBER OF DEATHS			PERCENTAGE OF DEATHS TO TOTAL TREATED		
	Europeans	Asiatics	Total	Europeans	Asiatics	Total	Europeans	Asiatics	Total
(a) 1902	1,159	26,515	27,674	68	4,406	4,474	5.86	61	16.16
(b) 1903	1,043	24,324	25,367	45	3,911	3,956	4.31	16.07	15.6
(c) 1904	1,163	24,769	25,932	69	3,767	3,836	5.93	15.21	14.79

(a) Includes 331 cases and 42 deaths in Lunatic Asylum. (b) Includes 400 cases and 55 deaths in Lunatic Asylum.
(c) Includes 485 cases and 59 deaths in Lunatic Asylum.

Penang and Malacca the general condition may be considered satisfactory, but in the former Settlement fears are also expressed of the water supply running short. In the province improvement goes on slowly but steadily.

(9) *Hospitals and Work done.*—The total number of admissions into the hospitals during 1904, excluding the lunatic asylum, was 23,462 against 23,150 in 1903.

(10) The preceding table shows the work done during the last three years.

(11) The diseases responsible for the greatest number of admissions and deaths are shewn in the subjoined Tables, compared with the corresponding diseases and deaths in 1903.

I.—GENERAL DISEASES.

DISEASES	1903		1904	
	Admissions	Deaths	Admissions	Deaths
Dysentery ..	707	267	723	245
Malarial Fever ..	2,005	151	2,694	205
Beri-beri ..	1,919	647	2,631	879
Phagedæna ..	234	60	544	67
Tubercle of Lungs	730	408	853	484
Veneral Diseases	1,818	96	1,784	95
Rheumatism ..	1,075	..	823	1
Anæmia ..	964	262	590	93
Debility ..	907	339	757	270

II.—LOCAL DISEASES.

DISEASES	1903		1904	
	Admissions	Deaths	Admissions	Deaths
Diseases of the Nervous System (including admissions to the Lunatic Asylum less cases transferred there from other hospitals) ..	736	112	651	138
Diseases of the Respiratory System (not including Phthisis)	574	108	496	126
Diseases of the Digestive System (including Diarrhœa) ..	2,028	678	1,616	524
Diseases of the Skin ..	2,626	4	2,997	4

III.—INJURIES.

	1903		1904	
	Admissions	Deaths	Admissions	Deaths
General and Local	1,557	56	1,831	139

(12) *Operations.*—One hundred and twenty-four operations, returned as such, were performed, with 5 deaths. There were also 226 operations performed in the General Hospital, Singapore, requiring the use of

an anæsthetic. These were included in the return under the diseases for which they were admitted, but a separate statement shewing the operations performed is put up.

(13) Six specimens of malignant tumours and growths were forwarded to the Superintendent of the the Cancer Research Fund, London, from Singapore, and seven from Penang.

(14) The recovery rate in the Lunatic Asylum in 1904 shows an improvement over that of 1903.

The Maternity Hospital return shows that good work was done there during the year. One Probationer passed her examination and was granted the usual certificate.

(15) *Quarantine.*—Two hundred and seventy-nine thousand two hundred and ninety-seven crew and passengers were examined on arrival in Singapore, and 4,444 pilgrims on departure. In Penang the numbers inspected were 184,691 crew and passengers and 1,435 pilgrims. There seems to be a great reduction in the number of pilgrims inspected both in Singapore and Penang in 1904 as compared with 1903.

Further needed improvements, details of which will be found in the appendix under Quarantine, were carried out on the Station at St. John's. The Port Health Officer reports that the disinfecting steam lighter *Hygeia*, fitted with a Clayton disinfecter, has answered all expectations.

(16) *Out-Door Dispensaries.*—Nineteen thousand nine hundred and seventy patients attended at the various Out-Door Dispensaries in the several Settlements during 1904 as against 18,031 the year previous.

(17) *Vaccination.*—The total number of vaccinations performed throughout the Colony during 1904 was 15,765 as against 15,496 in 1903. The following table shows the number vaccinated, with the results in the several Settlements during 1904.

SETTLEMENT	Number of Vaccinations Performed	RESULT			
		Perfect	Modified	Failed	Unknown
Singapore ..	2,554	2,551	..	3	.. (a)
..	1,797	1,631	9	96	61 (b)
..	376	356	3	17	.. (b)
Penang ..	3,280	2,266	633	177	204
Dindings ..	133	44	7	13	69
Province Wellesley	3,680	2,924	287	452	17
Malacca ..	3,945	3,379	72	387	107
Total ..	15,765	13,151	1,011	1,145	458

(a) By Government Vaccinator. (b) By Licensed Vaccinators.

The above do not include vaccinations performed in the prisons or at the Quarantine Stations. Saigon Lymph was used throughout the year. The results, although not very satisfactory, especially in Province Wellesley, appears to be an improvement over those of 1903.

(18) *Staff.*—Dr. G. D. Freer, Colonial Surgeon Resident, Penang, returned from leave on March 5th, relieving Dr. T. H. Jamieson, a private medical practitioner.

Dr. R. Dane, Colonial Surgeon, Singapore, proceeded on long leave to Europe on March 4th, his place being taken by Dr. W. S. Sheppard, Supernumerary Colonial Surgeon.

Dr. J. Catto resigned his appointment as Resident Medical Officer, St. John's, and Assistant Port Health Officer, and was succeeded by Dr. D. M. M. Ross, from England, on March 19th.

Dr. A. L. Hoops was appointed House Surgeon in the General Hospital, Penang, a new appointment, and arrived there from England on June 9th.

Assistant Surgeon H. J. Gibbs returned from long leave on November 18th, after having successfully passed the examinations for the L.R.C.P.Lond., and M.R.C.S.Eng. He also took the certificate in psychological medicine.

Assistant Surgeons M. W. Laporte (Singapore), and S. A. O'Keefe (Penang), retired during the year.

Dr. Edith Boomgardt was appointed Assistant Registering Officer of deaths in Penang in place of Assistant Surgeon O'Keefe, retired. An additional Assistant Surgeonship was sanctioned for the Quarantine Station at Singapore. This was temporarily filled by the appointment of Mr. A. P. Dantes, M.R.C.S., L.R.C.P., whose services were also utilised at the General Hospital as House Surgeon.

The posts of matron and three nurse probationers were added to the Lock Hospital, Singapore, and two nurse probationers to the General Hospital, Penang.

There were several changes among the nursing staff tending much to disorganise good work and discipline.

With the exception of some old hands the dresser staff does not seem to be satisfactory. Although the scheme for salaries has been improved the class of men applying for admission is not promising. This branch of the medical service requires to be strengthened, and I hope, with the opening of the Medical School in the Colony, to have men joining for a lower degree, say, of hospital assistant.

(19) Two Straits Students, Messrs. Sit Peng Lok and B. G. Samy, passed the grade of Assistant Surgeon in Madras, returned to the Straits in 1904, and filled up two posts vacant from the beginning of the year in Province Wellesley and Malacca respectively. At the end of the year there were eleven student apothecaries of the Straits Government in the Madras Medical College. In view of the establishment of a medical school in Singapore no more students will be sent to Madras in future.

(20) The Morphine Ordinance and Opium Ordinance were amended with a view to bringing those dealing in those articles as chemists and druggists under more efficient control, and restricting all unqualified medical men from prescribing the same.

(21) In September, 1904, the Honourable Tan Jiak Kim, a member of the Legislative Council and an influential member of the Chinese community, petitioned the Government on behalf of the Chinese and other communities of this Colony praying for the establishment of a medical school. The Government, notwithstanding the difficulties hitherto experienced in the proposal to establish such an institution, expressed its willingness to sanction such an undertaking, provided the petitioners were willing to pay for the initial cost of same, *i.e.*, for

the building and equipment, and raise an endowment fund of \$60,000 for the payment of ten scholarships for students of native origin, the Straits Government and the Government of the Federated Malay States undertaking to give five Scholarships each in addition, and paying for the staff and upkeep of the said school. With commendable promptitude Mr. Tan Jiak Kim managed to collect subscriptions far in excess of the amount actually required. All preliminary steps for the establishment of the school have been taken. A Bill constituting the necessary Council will soon be introduced in the Legislative Council, and in a few months hence the school will be an accomplished fact.

May 12th, 1905.

APPENDICES.

SINGAPORE.

Report by Dr. J. Leask, Colonial Surgeon Resident.

TABLE A—1.

	Remaining on 31.12.03	Admitted	Total Treated	Discharged	Transferred	Died	Remaining on 31.12.04	Percentage of Deaths to Total Treated
European ..	20	615	635	553	11	42	29	6.61
Natives ..	82	2,169	2,251	1,736	175	261	79	11.63
Native Police..	12	377	389	375	1	1	12	0.25
Totals ..	114	3,161	3,275	2,664	187	304	120	9.28

The work in the wards has been heavy throughout the year, not so much owing to the increase in the number of admissions, which was only 57 over the previous year, as to the large number of daily sick (163,045, the highest on record for this Hospital) and to the large number of Surgical cases in the Native Wards.

Of the General Diseases causing admissions to Hospital, the various manifestations of Malaria come first with 333 admissions and 12 deaths. Next in order are Venereal diseases (including local affections) 298 with 5 deaths, Beri-beri 126 with 41 deaths, Dysentery 120 with 31 deaths, Tuberculosis 108 with 4 deaths, Enteric Fever 76 with 22 deaths, Dengue 45 cases, Debility 32 and 1 death, Anæmia 28 and 1 death, Febricular 20 cases, Tetanus 6 with 4 deaths, Erysipelas 6 with 2 deaths, Pyæmia 4 with 3 deaths, Septicæmia 3 and 3 deaths.

Of the Nervous Diseases, Insanity in its various forms 171, Meningitis 8 cases and 8 deaths were the most noteworthy.

Diseases of the Eye caused 20, of the Ear 15 and Heart diseases 15 admissions with 2 deaths.

Respiratory Diseases.—Pneumonia 42 cases and 15 deaths, Bronchitis 40 and 1 death, Asthma 17 and 1 death and Pleurisy 11 cases were the most noteworthy.

Diseases of the Digestive System.—Diarrhoea 34 cases and 3 deaths, Sprue 18 cases and 2 deaths, Fistula in Ano 17, Constipation 16, Hernia 13 cases and 2 deaths, Hepatitis 13 cases and 2 deaths, Liver Abscess 12 cases and 8 deaths, Appendicitis 12 cases and 2 deaths, Piles 5, and Cirrhosis of Liver 4 cases and 1 death.

Colonial Medical Reports.—No. 21.—The Straits Settlements (continued).

Urinary System.—Bright's disease 9 cases and 1 death.

Diseases of Bone.—Periostitis 5, necrosis 5, caries 4, are of interest.

Diseases of Connective Tissue.—Abscess 49, cellulitis 22 cases.

Skin Diseases.—The most numerous of these were : Ulcer 79 and 1 death, and eczema 25.

Injuries.—The most numerous general injuries were : Multiple injury 35 cases with 10 deaths, burns and scalds 31 cases with 8 deaths, heat-stroke 5 cases and 1 death.

Of the 650 local injuries the most important were : Wounds 480 cases with 4 deaths, compound fracture 64 cases with 14 deaths, simple fracture 45 cases with 5 deaths—these last were in cases of fracture of the spine.

Of poisons the more important were : Alcohol 54, opium 5 cases and 2 deaths, lead and mercury 1 case each.

Parasites.—The most numerous were : *Acarus scabiei* 25 cases, mostly in Chinese Sinkehs, and others of interest were *Ascaris lumbricoides* 3, *Ankylostoma duodenale* 7, *Filaria sanguinis hominis*, 6, *Tenia solium*, 4.

After twenty-one years' experience of the Straits, I cannot help being struck by the steady increase of certain diseases during that period, amongst the Asiatic population chiefly.

The first of these is tuberculosis, mostly of the lung. This disease having once got a footing and having found a suitable environment, has steadily spread.

Along with this I find that fistula in ano is becoming much more common, and lately a few cases of disease of bone, hitherto absent, are beginning to appear.

Pneumonia has been making rapid strides during the last few years.

Enteric fever has become common amongst Europeans and natives.

When in 1884 I reported a case of diphtheria my report was received with incredulity, and I was informed that the disease was not known in the Straits. Since then there have been a number of unmistakable cases, many of them fatal.

A warm, moist climate such as this is an ideal one for the breeding of pathogenic micro-organisms, especially in the crowded native quarters, and it remains a matter of quarantine to keep other infectious germs out.

It is scarcely necessary to animadvert on venereal diseases, which have always caused a large proportion of admissions to hospital, except that they are probably an important factor in the causation of insanity, yet general paralysis of the insane, as it appears in Europe, is unknown in Asiatics, and locomotor ataxy is rare.

The Asiatic is becoming Europeanised — too much so—stalls for the sale of bread and butter may be seen along the streets ; the domestic servant, who would not help himself to any European beverage but brandy and sherry, has now taken quite kindly also to whiskey and beer, and in fact to anything with alcohol in it, very much to his detriment ; and now, though the admissions for alcoholism are still mostly in Europeans,

there are a few Asiatic admissions from this cause, Chinese, Sikhs, and Tamils.

Three thousand one hundred and sixty-one patients (of whom 220 were females) were admitted, as against 3,104 in 1903, and the total number treated was 3,275, as against 3,233 in 1903.

The average daily number of sick was 163.045—the highest on record—as against 130.22 in 1903.

Deaths.—There were 304 deaths (28 among females), 73 of which occurred within a few hours of admission.

The percentage of deaths to total treated was 9.282, as against 9.029 in 1903.

European Wards.—There were 615 cases (of whom 70 were females) admitted to these wards. European members of the Police Force are included in these admissions.

The diseases for which the greatest numbers were admitted were : Venereal diseases 71, malaria 49, alcoholism 39, tuberculosis 31, dysentery 19, rheumatism 10, parasites 10, liver abscess 9, hepatitis 7, appendicitis 6.

Local and general injuries were the cause of 70 admissions.

Zymotic Diseases.—Small-pox 4, dengue 29, mumps 3, enteric fever 22, influenza 1.

Transfers.—There were 11 transfers, 3 to quarantine, 3 to native wards, and 5 to lunatic asylum.

Deaths.—There were 42 (6 being females).

The percentage of deaths to total treated in the European wards was 6.614.

Native Wards (not including native police).—There were 2,169 patients (of whom 150 were females) admitted, as against 2,187 and 141 respectively in 1903.

The diseases for which the largest numbers were treated were : Malaria 235, insanity 162, beri-beri 118, venereal diseases 140, dysentery 86, tuberculosis 67, ulcer 63, abscess 39, pneumonia 35, anæmia 24, diarrhoea 23, bronchitis 20, rheumatism 20, fistula in ano 15, alcoholism 12, constipation 12, debility 21, heart diseases 11, asthma 11, hernia and sprue, each 10, Bright's disease 7, hepatitis 6, appendicitis 5, abscess liver 3.

Local and general injuries were responsible for 630 admissions.

Zymotic Diseases.—Enteric fever 52, dengue 12.

Five Chinese patients developed beri-beri in the ward while under treatment for other diseases respectively 14, 19, 71, 111 and 115 days after admission.

Deaths.—There were 261 deaths (22 of whom were females) among patients treated in the native wards ; 65 died within a few hours of admission.

The percentage of deaths to total treated was 11.63.

The number of native private patients depositing money in advance to defray hospital expenses was 662, as against 778 in 1903.

Native Police.—There were 377 admissions, as against 353 in 1903.

The causes of admission were : Venereal diseases 79, malaria 49, malingering 40, bronchitis 16, ulcer 15, dysentery 15, tubercle 10, rheumatism 10, beri-beri 6, pneumonia, asthma, varicose veins and sprue, each 4, alcoholism 3, local and general injuries 21.

Zymotic Diseases.—Dengue 4, small-pox 1, chicken-pox 1, enteric fever 2, and influenza 4.

Transfers.—One to quarantine camp.

Absconders.—There were 58, mostly Malays.

Deaths.—One Malay died of beri-beri.

Percentage of deaths to total treated, .25.

Medico-legal Work.—There were 1,242 cases sent to hospital by the police for examination or admission, as against 914 in 1903.

There were 57 dead bodies sent for *post-mortem* examination by the coroner, as against 76 in 1903.

There were 189 persons sent to hospital for observation as to sanity, as against 161 in 1903.

My observation with regard to sending these to the General Hospital in my report for 1903 holds good for 1904.

Operations.—There were 226 surgical operations, requiring the administration of a general or local anæsthetic, performed during the year.

The most numerous and interesting were: On tumours 3, abscess 31, excision of glands 23, removal of sequestra 13, excision of shoulder 1, amputations 20, trephining skull 2, harelip 1, enucleation eyeball 5, suturing divided tendons 3, paracentesis thoracis 1, excision of ribs for empyema 1, exploratory puncture of liver 2, gastrostomy (Francke's) 1, hepatic abscess, 12, abdominal section for suturing wounded intestine 3, strangulated hernia 9, hernia radical cure 2, typhlitic abscess 1, fistula in ano 12, circumcision 17, hydrocele radical cure 3, removal lymph scrotum 1, elephantoid labium 1, curetting uterus 3, ovariectomy 1, abdominal section for pelvic hæmatocele 2.

During the last twenty-four years it has been my practice to give from 25 to 30 minims of tincture of belladonna a quarter of an hour or twenty minutes before the administration of chloroform, and I have had no case of death from chloroform in my practice during all these years. The active principle of this drug has a paralysing action on the cardio-inhibitory fibres of the vagus and so prevents reflex inhibitory impulses from affecting the heart's action.

As an Asiatic will just as soon part with his life as with a limb, a great deal of the surgery in this hospital is necessarily ultra-conservative, and the death-roll is consequently heavy, and stay in hospital long. On the other hand, the most wonderful recoveries take place sometimes.

Staff.—I have been in charge throughout the year.

House Surgeons.—Dr. Ford and Dr. Barrack have been house surgeons, and on September 1st, Mr. A. P. Dantes, M.R.C.S., L.R.C.P.Lond., assistant surgeon, took duty in addition as acting house surgeon, thus placing a great deal more time for purely professional work at the disposal of the house surgeons.

It would be to the advantage of the hospital to have three house surgeons permanently, there being too much work for two.

In the subordinate staff I have to record numerous changes again, militating against the efficiency of the hospital.

POLICE FORCE.

Report by Dr. W. G. Ellis, Police Surgeon.

The total number of the force attending the outpatient room at the Central Station was 4,096, as compared with 3,478 for 1903, and 4,305 for 1902. More of these than is usual were malingerers, and when it could be definitely brought home to them they were reported and punished. Latterly I have sent many of those whom I considered to be malingering to hospital for observation, where they were detained for a few days and so lost their pay, and the crime is now diminishing.

The greatest number seen on any one day was 34, the lowest 2.

The average daily number attending shows a slight increase over the previous year; it was as follows:—

Month	1899	1900	1901	1902	1903	1904
January ..	32.72	17.69	14.12	12.92	12.08	11.83
February ..	23.95	18.33	12.55	11.70	15.90	11.62
March ..	29.76	18.15	13.73	11.12	11.72	12.11
April ..	28.04	18.02	14.86	17.10	12.14	11.12
May ..	28.57	19.01	12.34	17.32	11.68	14.52
June ..	25.65	22.64	12.33	17.70	13.74	15.61
July ..	23.03	18.72	11.77	15.00	12.18	15.07
August ..	22.37	18.97	12.65	12.05	11.08	11.88
September ..	28.65	16.04	13.08	14.00	10.46	12.69
October ..	29.19	21.93	12.66	14.10	10.25	16.46
November ..	26.65	21.50	13.2	14.10	10.63	13.57
December ..	25.84	18.91	13.08	16.22	10.30	14.82

Of the out-patients seen, 357 were sent to hospital as in-patients, compared with 556 sent to hospital in 1899, 290 in 1900, 294 in 1901, 350 in 1902, and 317 in 1903. Others of the force have been admitted to the General Hospital for treatment, having been sent by inspectors as urgent cases; of these I have no records.

The 357 were suffering from the following disorders: Unclassed fevers 65, intermittent fever 5, dengue 10, enteric fever 2, dysentery 10, diarrhoea 17, beri-beri 12, phthisis 4, bronchitis 16, pneumonia 1, appendicitis 1, Bright's disease 2, rheumatism 11, syphilis 40, gonorrhoea 37, cellulitis 20, synovitis 5, ulcers 8, minor injuries 9, hydrocele 3, eye and ear affections 9, skin diseases 6, tape-worm 3, alcoholism 4, debility 9, malingering 48.

During the year there have been 70 cases of beri-beri, with 2 deaths, and necessitating the invaliding of three men from the service. Nearly all of these cases occurred in the Central Station in the months of June and July. This station at the time was much overcrowded, men using the same beds in relays, and no proper attention was paid to cleanliness. The cessation of the overcrowding, a thorough clean up, and the regular use of disinfectants, quickly bore fruit, though a few odd cases continued to occur until nearly the end of the year. The cases were mostly slight, and coming under observation early soon recovered upon being transferred to the seaside stations.

Three hundred and thirty-three candidates for the force were examined during the year; of these 262 were passed as fit, and 71 were rejected.

The causes for rejection were as follows: Over age 4, ill-development 24, phthisis 8, hernia 2, anæmia 4, heart disease 9, enlarged spleen 7, hydrocele 1, venereal diseases 8, and impaired vision 4.

The nationalities were: Twelve Europeans passed and none rejected, 117 Malays passed and 35 rejected, 52 Sikhs passed and 14 rejected, 37 Indians passed and 12 rejected, 30 Chinese passed and 8 rejected, 5 Eurasians passed and none rejected, and 9 Sikhs passed for re-engagement and 2 rejected.

The sanitary conditions of the 35 stations are fairly satisfactory, and several minor improvements have been completed during the year. Details of inspections, with my suggestions, are made in a book which is forwarded to the Chief Police Officer from me to time.

PRISON HOSPITAL.

Report by Dr. J. Leask, Colonial Surgeon in Charge.

The sanitary condition of the prison was fair, and was further improved during the year.

I mentioned in my report for 1903 that more ventilation was required for the cells and in the Middle Grade Work Yard.

Dr. C. W. Daniels, Director of the Institute of Medical Research, Federated Malay States, visited the prison in February and reported on its sanitary condition, making certain recommendations.

The following additions and alterations were carried out:—

(a) Perforated iron plates were inserted at the bottoms of the cell doors, giving better floor ventilation.

(b) Iron weather-boards were fixed over the cell windows, and the wooden boards placed inside the windows in wet weather were done away with. In some instances, notably at the punishment cells, these plates have been too much sloped, cutting off too much light.

(c) The bathing tanks were separated from the latrines, thus doing away with a possible source of contamination of water, as prisoners will drink from the bathing tanks when not watched.

(d) The latrine in the kitchen, also contiguous to a water-tank, was done away with, and a more sanitary arrangement made outside the kitchen.

(e) A new set of water-pipes was laid throughout the prison, away from the drains, doing away with another possible source of water contamination.

(f) The cement work of the prison was relaid throughout, with the exception of the interiors of the halls. When newly laid down this work has been so slippery that a number of accidents have occurred—two warders slipped and broke their arms, and quite a number of falls amongst warders and prisoners have occurred.

(g) The flat parts of the roofs of the blocks were sloped and extra down pipes fixed in order to carry away storm water more rapidly.

(h) Iron gratings were substituted for honeycomb brickwork in the arches under the blocks. These are hinged and locked so as to give access for cleaning purposes.

(i) The flattened roof ends of the workshops and wheelhouse were carried out as open gable ends, and this has produced a marked improvement in the air of these places.

(j) An allowance of soap is now being issued to the prisoners for body-cleansing.

(k) The substitution of brick for corrugated iron partitions between the cells is being carried on steadily, but not very carefully, as I notice numerous crevices at the angles of the cells.

In spite of all improvements three cases of enteric fever occurred, two of whom must have contracted the disease in the prison; dysentery has been prevalent; one case of what was clinically cholera occurred, and beri-beri cases have increased in numbers.

The health of the prisoners during the year was not satisfactory. Although there were fewer admissions to hospital (1,009, as against 1,041 in 1903) the average daily sick was much higher (72·47, as against 44·96 in 1903) and the number of deaths was greater than during the previous year.

There were 52 deaths in hospital, as against 45 in 1903 and 38 in 1902, giving a death-rate of 48·01 per mille of total treated, as against 40·7 in 1903 and 26·04 in 1902.

Out of 3,052 male prisoners examined on admission, 1,146 showed signs of present or past venereal disease, as against 916 in 3,272 admissions in 1903.

Diets.—Bengal rice, i.e., rice which has gone through a process of malting, was given instead of Siamese rice on November 1st (except for congee making, for which it was unsuitable).

Births.—A Chinese short sentence prisoner was delivered of a child in February.

Work done in Hospital.—There were 74 patients remaining in hospital on December 31st, 1903; 1,009, of whom 10 were females, were admitted during 1904, giving a total treated of 1,083. Of these, 936 were discharged, 30 transferred to Malacca, 52 died, and 65 remained on December 31st, 1904.

The diseases responsible for the greatest number of admissions were:—

Beri-beri ...	266 cases, as against 169 in 1903 and 415 in 1902.
Fevers ...	163 cases, as against 163 in 1903 and 188 in 1902.
Dysentery ...	136 cases, as against 104 in 1903 and 156 in 1902.
Dyspepsia ...	87 cases, as against 43 in 1903 and 66 in 1902.
Diarrhœa ...	67 cases, as against 112 in 1903 and 186 in 1902.

Deaths.—There were 52 deaths, as against 45 in 1903. The causes of death were dysentery 19, beri-beri 17, pulmonary tuberculosis 7, heart disease 2, cholera, enteric fever, cancer of stomach, fibroid phthisis, enteritis, compound fracture of thigh and cerebral hæmorrhage in beri-beri patient 1 each.

Beri-beri.—Instead of exacerbating towards the end of the year, as it did in 1903, this disease quickly declined from September, as shown in the subjoined comparative table.

In the first quarter of the year there were 63 admissions and 2 deaths, in the second quarter 55 admissions and 3 deaths, in the third quarter 108

TABLE A-2.
SHOWING THE ADMISSIONS AND DEATHS MONTHLY SINCE THE BEGINNING OF THE OUTBREAK.

Month	1897		1898		1899		1900		1901		1902		1903		1904	
	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths
January	1	..	22	..	5	..	15	1	22	1	22	2	80	2
February	1	..	25	..	3	..	10	..	8	1	6	..	13	..
March	25	..	1	..	4	..	2	..	6	..	20	..
April	1	..	23	..	8	..	17	..	8	..	3	..	16	..
May	2	..	5	..	14	2	25	1	18	..	1	..	28	2
June	7	2	32	2	17	3	79	3	3	..	11	1
July	1	..	7	..	86	2	23	2	86	..	1	..	29	1
August	2	..	19	..	8	1	12	..	27	..	..	..	34	2
September	6	..	3	..	32	1	10	..	36	3	2	..	45	7
October	10	..	5	..	24	2	19	1	62	1	7	..	26	1
November	78	1	8	..	44	7	41	1	35	1	53	6	10	..
December ..	1	..	22	..	16	..	17	11	26	..	32	1	65	8	4	1
	3	..	124	1	165	2	224	28	219	9	415	11	169	16	266	17

admissions and 10 deaths, and during the fourth quarter 40 cases and 2 deaths.

The third quarter was therefore the most unhealthy as regards beri-beri this year, and in consequence of the large numbers overcrowding the hospital, 30 cases of beri-beri were sent to Malacca on October 6th.

There were 266 admissions and 17 deaths, as against 169 admissions and 16 deaths in 1903, giving the percentage of deaths to total treated as 6.7, against 9.4 in 1903.

Grades Affected.—One hundred and fifty-three cases of beri-beri occurred among short sentence prisoners, 68 among middle, 21 among lower, 15 among revenue, and 5 among upper grade prisoners: 3 cases occurred in prisoners undergoing simple imprisonment and one in a civil prisoner.

in the *Times* newspaper on the Chinese coolie question in South Africa it was stated by a medical writer that females were immune from beri-beri. There were 6 well-marked cases of beri-beri in female prisoners in 1904, 1 Chinese and 5 Malays. In 1900 there were 7 female cases; in 1901, 1 Chinese; in 1902, 1 Chinese; in 1903, 1 Malay.

Length of Imprisonment of those Attacked.—Of the 266 admissions, 51 were primary attacks occurring in prisoners under three months in prison; 87 were primary attacks occurring in prisoners over three months in prison; 5 were recurrences occurring in prisoners under three months in prison; 52 were recurrences occurring in prisoners over three months in prison; 10 were admitted suffering from the disease, and 61 had a previous history of having suffered from beri-beri outside the prison.

TABLE A-3.
TABLE SHOWING THE INCIDENCE OF BERI-BERI IN THE DIFFERENT GRADES, SINCE THE BEGINNING OF THE OUTBREAK.

Grade	1897	1898	1899	1900	1901	1902	1903	1904	Total
Upper .. .	..	7	6	9	13	19	9	5	68
Middle .. .	..	94	123	105	55	129	37	68	611
Lower .. .	..	8	6	40	40	102	27	21	244
Short Sentence ..	3	12	23	52	102	136	88	153	569
Revenue .. .	..	3	6	8	7	19	5	15	63
Civil Prisoners ..	..	..	1	2	2	10	3	4	22
His Majesty's Pleasure ..	..	..	..	1	..	..	..	..	1
Females .. .	..	..	..	7	1*	1*	1*	6*	7
Total .. .	3	124	165	224	219	415	169	266	1,585

*. Included under Grades.

Nationalities attacked by Beri-beri.—Chinese 229 with 15 deaths, Malays 28 with 1 death, Indians 8 with 1 death, and Filipino 1.

Sexes attacked by Beri-beri.—In the correspondence

Deaths from Beri-beri.—There were 17, and one beri-beri case died of cerebral hæmorrhage and softening. Of these, 14 were short sentence, two middle and one lower grade prisoners.

Colonial Medical Reports.—No. 21.—The Straits Settlements (continued).

Dysentery.—There were 136 admissions and 19 deaths, as against 104 with 13 deaths in 1903. The disease continues to be of a severe type, and ipecacuanha in large doses, with intestinal irrigation (alkaline in the early stages, and of nitrate of silver $\frac{1}{2}$ grain to one ounce in later and more chronic cases), have given the most satisfactory results.

Post-mortem examinations in the fatal cases have shown the same deep necrosis of tissue mentioned last year.

Grades Attacked.—Short sentence 62 cases, middle grade 33, lower grade 22, revenue grade 7, upper grade 3, remand prisoners 4 (simple imprisonment 3), and 2 prisoners from banishment.

Nationalities.—Europeans 2, Chinese 93 with 12 deaths, Malays 27 with 1 death, Indians 13 with 5 deaths, Anamite 1 died.

Dyspepsia.—This has been more prevalent this year, causing 87 admissions, as against 43 in 1903. Fissured tongues and cracked lips, and an eruption of lichen planus are also making their appearance.

Zymotic Diseases.—One case of chicken-pox and one case of measles occurred in short sentence prisoners. The former case probably contracted in prison, and the latter probably came into prison with the disease in the period of incubation.

Cholera.—One Chinese short sentence prisoner contracted cholera after having been over three months in prison, and died within a few hours. Clinically, it was a typical case, but the bacteriological examination was negative.

Enteric Fever.—There were 3 cases during the year.

The first was that of a European short sentence prisoner who was committed to prison on July 22nd, and admitted to hospital on August 2nd, having been feeling unwell for eight or ten days before.

The second case was a Chinese lower grade No. 164, committed to prison March 1st, and admitted to hospital December 13th. The source of infection was probably outside the prison.

The third case was a Chinese lower grade No. 175, committed to prison March 16th, and admitted to hospital December 21st.

The European and one of the Chinese (No 175) recovered, and the other Chinese (No. 164) died.

In the two latter cases Vidal's reaction was positive.

In the fatal case the *post-mortem* appearances were very well marked.

There was one case of mumps.

In none of these infectious cases could the source of infection be traced.

TAN TOCK SENG'S HOSPITAL.

Report by Dr. W. S. Shepherd, Acting Colonial Surgeon.

Buildings.—Only such repairs as were absolutely necessary have been executed during the year, owing to the prospect of an early removal of the hospital to a new site.

The usual whitewashing and tarring were performed

twice during the year by the Public Works Department.

Grounds.—The digging of long trenches in many places leading into the main drains has done much to improve the drainage of the grounds.

The hospital is to be congratulated on having obtained the services of Dr. Finlayson as Pathologist. He now conducts the autopsies in all cases except those of medico-legal interest.

Statistics.—The total number of patients treated and the death-rate are set down in Table I., which also gives the figures for the preceding nine years. The death-rate—22.4 per cent.—is a little below the average.

A certain number of admissions are readmissions, as stated in last year's report. It is not easy to estimate this number, as patients when seeking readmission frequently give a new name.

The average daily number was 571.

Table II. gives the diseases for which admission was chiefly sought in 1904 and the previous four years, also the number of deaths from these diseases.

Beri-beri.—One thousand one hundred and twenty-five cases were admitted, as against 975 in 1903. I am inclined to attribute to this increase in our numbers the increase in our death-rate from this disease—46 per cent., as against 36 per cent. in 1903. Our beri-beri wards were undoubtedly too crowded, but there seemed no option between admitting the sick and sending them back to their houses to die. Many of our admissions under this head were cases brought in by the police, who could not be refused admission. A certain number of cases about 60—appeared to have originated in the hospital; but owing to the difficulty of diagnosing latent beri-beri it is not possible to estimate this number with exactness.

During the year trial was made of potassium permanganate as a remedial agent, this drug being administered in two-grain doses twice daily. No good appeared to follow this treatment and after a few months it was discontinued. Our experience seems to indicate that a milk diet is best for this disease. Blisters over the pericardium appear to relieve the distressing cardiac dyspnoea better than any other treatment.

Fevers.—There were 617 cases of malarial fever, 245 cases being of the benign and 372 of the malignant variety. The prevalent benign form is tertian, not more than a dozen cases of quartan occurring in the year. Twenty per cent. of malignant and seven per cent. of the benign cases proved fatal, many of the patients being brought in in a comatose condition by the police.

The intramuscular injection of quinine has been practised in all cases when a rapid result was desirable. No ill-effects have been recorded in a single instance.

There were 70 cases of enteric fever with 36 deaths, as against 11 cases with 7 deaths in 1903. The high mortality rate is due to the lack of skilled nursing and to the fact that the patients are so often brought to hospital in a dying condition.

Fourteen major operations were performed, mostly amputations of the leg for large intractable ulcers.

General Remarks.—During the year I have found it necessary to institute the following changes :—

To set apart a separate staff of dressers for night duty. Hitherto continuous night and day duty has been expected of the dressers, an obviously impossible expectation.

The only drawback to the present system is that it depletes our already very insufficient day staff.

Two senior dressers have been set apart, one for dispensing, the other as steward.

To attempt to locate the dresser to the wards under his particular care. To this end, a table and a chair have been given him in one of his wards, and the dressers' room, situated too far away from the wards to be useful, has been converted to another purpose.

A system of diet indent book wherein the dresser writes his indent each afternoon for the succeeding day. This secures a permanent record, by which expenditure can be checked by myself.

A daily roll-call of the attendants has, indirectly, done much to lessen the number of those running away after each pay day.

An attendance book has been placed in each ward for recording the time and duration of the assistant surgeons' and dressers' visits.

The large staff of ward attendants, coolies, barbers, toties, &c., amounting to about seventy men in all, has been struck off the list of patients. Our daily average number of patients is thus less by this number.

TABLE I.
TAN TOCK SENG'S HOSPITAL.

Year	Remained	Admitted	Total	Died	Average Daily Sick	Percentage of Deaths to Total Treated
1895	536	5,583	6,119	1,465	547	23.94
1896	547	7,041	7,588	2,124	575	26.72
1897	652	7,110	7,762	1,733	598	22.32
1898	617	6,425	7,042	1,402	623	19.63
1899	583	5,887	6,470	1,394	560	21.50
1900	583	5,941	6,524	1,459	574	23.36
1901	549	6,556	7,105	1,694	563	23.84
1902	528	6,562	7,090	1,583	529	22.32
1903	550	6,968	7,518	1,663	589	22.12
1904	562	6,536	7,098	1,590	571	22.40

TABLE II.
TAN TOCK SENG'S HOSPITAL.
Showing Admissions and Deaths from certain Diseases.

Diseases	1904		1903		1902		1901		1900	
	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths
Beri-beri ..	1,125	521	975	395	752	312	747	405	708	305
Ulcer ..	679	..	823	..	..	..	743	..	819	..
Rheumatism ..	327	..	674	..	..	..	518	..	651	..
Anæmia ..	280	83	549	167	324	106	294	99	301	113
Debility ..	233	123	430	184	362	118	375	172	150	84
Diarrhœa ..	219	115	402	252	296	176	398	279	437	285
Dysentery ..	195	95	256	127	..	96	..	126	..	158
Secondary Syphilis ..	397	29	344	54	..	..	420	35	324	38
Tuberculosis ..	343	212	288	190	498	293	412	273	276	186
Malarial Fever ..	617	95	..	..	..	..	..	..	..	..

QUARANTINE CAMP.

(1) SMALL-POX.

	Remained	Admitted	Total	Discharged	Died	Abandoned	Remaining
Male ..	1	19	20	13	2	1	4
Female ..	..	6	6	4	2	..	..

Of those treated, 8 were Chinese, 6 Tamil, 6 Malays, and 6 miscellaneous.

(2) BUBONIC PLAGUE.

	Remained	Admitted	Total	Discharged	Died	Abandoned	Remaining
Male	8	8	..	8	..	..
Female	3	3	..	3	..	..

Of these cases, 8 were Chinese, 1 Tamil, and 2 Bombay men.

(3) DIPHTHERIA.

	Remained	Admitted	Total	Discharged	Died	Abandoned	Remaining
Male	3	3	1	2	..	..

Two were Chinese, and 1 Arab.

LEPER ASYLUM.

	Remained	Admitted	Total	Discharged	Transferred	Abandoned	Died	Remaining
Male ..	15	59	74	9	22	2	31	10
Female ..	20	6	26	..	..	..	6	20

The sanitary condition of the asylum was good.

The space allotted to the females is, however, very limited. The nine males discharged were handed over to the care of their relatives by order of the magistrate.

LUNATIC ASYLUM.

Report by Dr. W. G. Ellis, Medical Superintendent.

The average daily number of patients resident during the year was 268 (males 213, females 55), an increase of 53 males and 6 females as compared with the previous year.

On December 31st, 1903, there remained 231 patients (males 179, females 52). There were admitted in 1904, males 223, females 31, making the total treated 402 males and 83 females. The maximum

and minimum numbers in the asylum on any one day of the year were respectively 305 and 229.

Of the 283 patients remaining on December 31st, 1904 :—

Males.	Females.	Total.	
151	35	186	came from Singapore.
39	11	50	" " Penang.
8	3	11	" " Province Wellesley.
15	1	16	" " Malacca.
5	—	5	" " British North Borneo.
1	—	1	" " Labuan.
12	1	13	" " Negri Sembilan.
1	—	1	" " Johore.

There were 12 criminal lunatics and 2 lunatic criminals under treatment on December 31st, 1903; 9 criminal lunatics and 8 lunatic criminals were admitted during the year, making a total of 31 criminals treated; of these three were discharged recovered, 6 on expiry of sentence were transferred as ordinary patients, 4 died, and 14 criminal lunatics and 4 lunatic criminals remain under treatment.

Evidence of past and present venereal disease in the admissions, as in previous years, is common. Over 24 per cent. had suffered from syphilis, a percentage that has gradually increased from the 13.48 per cent. of the 1896 admissions. Syphilis was the undoubted cause of the insanity in many of the cases, and was the cause of death in 8 cases, 3 being due to gumma in the brain.

Beri-beri.—From October 13th, 1903, to October 13th, 1904, all patients were fed on the cured Bengal rice, and during this period but one case of beri-beri occurred in the asylum, a case attacked early in November, 1903. During this same period the disease was epidemic in the Singapore gaol, and formerly when epidemic in the one institution it was invariably epidemic in the other. On October 13th, 1904, we returned to the uncured Siam rice, and in December 15 cases of beri-beri arose, coming from all parts of the asylum, though none occurred amongst the 20 males and 8 females kept on Bengal rice as controls. I am far from being convinced that the consumption of the uncured rice is the cause of beri-beri, and have yet several experiments to complete; but my experience of the past few years, since making researches into the subject, certainly tends to make me far less antagonistic to the theory than formerly. My work is not yet ready for publication, but shortly I trust to have some results to bring forward.

In the early part of the year some of the underground drains in the lower levels of the asylum became blocked, and at the same time an epidemic of dysentery and diarrhoea broke out. In all there were 47 cases of bowels diseases with 9 deaths. The drains, after some delay, were dug up, substituted by surface drains, and the health of the asylum improved.

Towards the end of the year the asylum became considerably overcrowded, a possible factor in the outbreak of beri-beri, and the health of the patients suffered, many being attacked with dysentery and diarrhoea.

I am happy in being able to state that it has been decided to construct a new asylum upon modern and sanitary lines as soon as possible, and an excellent site with sufficient land for a farm has been chosen.

Admissions.—Two hundred and twenty-three males and 31 females have been admitted during the year; of these, 22 males and 7 females were readmissions.

One hundred and sixty-six males and 24 females came from Singapore, 21 males and 2 females from Penang, 17 males and 1 female from Malacca, 4 males and 3 females from Province Wellesley, 11 males and 1 female from Negri Sembilan, and 4 males from British North Borneo.

The physical condition of those admitted was in a large number of cases deplorable, as is usual here. Of the 254 admissions, 85 were chronicled as physical condition impaired, and 47 as greatly impaired. Of these latter, 15 died before they had been in residence a month.

Discharges.—One hundred and four patients have been discharged recovered, equal to a recovery rate of 40.94 on the admissions. This is a marked improvement upon last year, and must be considered satisfactory.

Twenty-three patients were discharged relieved and 11 not improved to the care of their friends. A far larger number of patients are fit to be discharged in this way, but their friends and relatives are in China, and we have no means of communicating with them.

Deaths.—Forty-eight males and 11 females died during the year. The percentage of deaths on the average number resident was 22.01, the lowest since 1893.

Forty *post-mortem* examinations were held and the results recorded.

Industries.—During the year there have been manufactured 3,792 yards of cloth and 33 blankets. From the cloth there have been made 745 pairs of trousers, 656 jackets, 261 women's jackets, 163 sarongs, and 108 dusters.

About 80 per cent. of our inmates are usefully employed, every encouragement in the way of small luxuries such as tobacco, fruit, &c., being given them to this end.

MATERNITY HOSPITAL.

Report by Mr. N. A. Wray, Assistant Surgeon in Charge.

The buildings are in good order. Four additional dwelling-rooms were erected during the year for servants.

Whitewashing, tarring and painting were carried out during the year.

Dr. Fowlie continued to render his valuable services to the hospital.

Mrs. Hennessy, the matron, has done very good work.

One probationer, Mrs. Massabini, passed her examination and received a diploma as midwife. Mrs. White is still under training.

The number of admissions (72) shows a decrease of 13 on last year, but as the hospital was closed from March 23rd to May 23rd owing to a case of septic-

æmia occurring in the hospital, the numbers compare favourably with previous years.

The following table shows the work done during the year:—

Nationality	Remained	Admitted	Total	Discharged	Died	Remaining
Europeans ..	1	28	29	29	..	..
Eurasians ..	..	4	4	4	..	..
Tamils ..	3	25	28	28	..	..
Chinese ..	..	10	10	8	2	..
Hebrew ..	..	4	4	4	..	..
Singhalese ..	..	1	1	..	1	..
Total ..	4	72	76	73	3	..

The three deaths were due to (1) septicæmia, (2) shock on rupturing membranes in a case of placenta prævia, and (3) from beri-beri and peritonitis, the patient, a Chinese, having been, it was said, in labour for nine days before seeking admission.

The average daily number in hospital was 2.02.

Of the 66 labours in hospital, 53 were natural, 4 were difficult, 8 were preternatural, and one was complex.

There were 3 cases of placenta prævia. The first, a Singhalese lady, died of septicæmia, the second, a Chinese, succumbed to shock, on rupturing the membranes, and the third, a European, came in early and made a good and rapid recovery.

There was one case of foot presentation and one of breech. There were also one case each of partial inversion of the uterus and premature detachment of the placenta. Forceps were used in three instances. There was one case of abortion in the fifth month.

Hæmorrhage occurred in five cases, three unavoidable (placenta prævia) and two accidental (partial inversion of the uterus and premature detachment of the placenta).

Of the 66 births, 57 children were born alive, 8 were stillborn and 1 prematurely, the sexes being 30 males and 36 females.

PENANG.

Report by Dr. T. C. Mugliston, Colonial Surgeon.

The public health of Penang for 1904 has been up to the average of previous years, and judging from the total number of deaths registered and by the death-rate per mille of the estimated population, though not so good as 1903, was better than that of the year 1902.

The total number of deaths registered was 5,517, as against 4,988 in 1903, and 5,787 in 1902; of the total number of deaths registered, 4,222 were within municipal limits and 1,295 in country districts. On an estimated population of 130,602, this gives a crude mortality of 42.24 per mille. Eliminating the deaths at Pulau Jerejak (Leper Asylum 140, quarantine station 6, and of those dying shortly after arrival in the colony, 309; town 279, country 30), the corrected death-rate for the island comes to 38.75; 40.49 per mille for the population within municipal limits, and 38.06 per mille for the country.

Zymotic disease in epidemic form was absent; small-pox, 3 cases only occurred in the town; 16 cases were imported and removed from vessels; of these 19 cases, 7 died. Chicken-pox—there were 66 cases (8 cases imported); measles 9 cases.

Cholera.—No cases were reported; 5 cases were imported and treated on Pulau Jerejak.

Enteric Fever.—One hundred and thirty-eight deaths were registered. According to hospital statistics, there were 10 admissions, with 6 deaths.

Plague.—Two cases occurred among a ship's crew, both cases were removed to the quarantine station, Pulau Jerejak, and died; the diagnosis was confirmed bacteriologically. No cases occurred in the town or country.

The infant mortality for 1904 was rather high, the number of infants dying under one year being 704, or 12.75 per cent. of the total number of deaths registered, and 28 per cent. of the total number of births registered. Referring back to the records for ten years, the number of infants dying last year is the highest, while the percentage to the total number of deaths registered comes second to the year 1899. Tetanus neonatorum accounts for about 19 per cent. of those infants dying under three months.

On the retirement of Assistant Surgeon O'Keefe on pension, Dr. Edith Boomgardt, L.R.C.P. & S. (Edin.), &c., was appointed Deputy Registrar of Deaths. During the first three quarters of the year 1904 the percentage of unclassified "fever" cases to the total number of deaths registered in municipal limits approximated 3.84 (first quarter 1.30 per cent., second quarter 1.26 per cent., third quarter 1.28 per cent.); in the fourth quarter, the percentage of such "fever" cases to the deaths registered in municipal limits is .78. Under the present careful investigation the vague item of "fever" is much curtailed, and returns are much better and fuller than formerly, and more care is taken in arriving at the cause of death. I have only referred to deaths within municipal limits; the majority of deaths (nearly 95 per cent.) registered in country districts are returned as "fever." If these unclassified "fever" cases, which are returned by the police, are eliminated, it will be seen that the number of unclassified "fever" cases in the town is almost nil.

GENERAL HOSPITAL.

Report by Dr. G. D. Freer, Colonial Surgeon, Resident.

The total number of cases treated was 2,117, and the number of deaths 86, as compared with 1,866 and 87 respectively for the previous year.

The average daily sick was 58.53, and the percentage of deaths 4.06.

European Wards.—There were 208 admissions in all, of whom 26 were females. The chief diseases treated were malarial fever 51, venereal disease 14, dengue 11, typhoid fever 5, diarrhœa 5, pneumonia 2, bronchitis 2, injuries 5, alcoholism 6.

Native Wards (excluding police).—The number of admissions was 1,171 (females 104) and deaths 72. The chief causes of admission were: Injuries 396, malarial fever 127, mental diseases 68, venereal diseases 69, alcoholism 46, ulcers 44, beri-beri 30, diarrhœa 25, dysentery 22, bronchitis 28, pneumonia 18.

Colonial Medical Reports.—No. 21.—The Straits Settlements (continued).

One hundred and thirty-five Indian immigrants were sent for treatment from the Indian Immigration Depot, and sixty-five Sinkhs from the Chinese Protectorate.

Eighty-two cases were sent for observation as to sanity, of whom 21 were transferred to the Lunatic Asylum, Singapore.

Native Police (including Malay States Guides).—The admissions numbered 686, against 495 for the previous year, and were made up as follows: Sikhs 355, Malays 297, Hindus 28, Chinese 6; of the Sikh admissions, 104 were from the detachment of Malay States Guides.

The principal diseases among them were malarial fever, 157; dengue, 45; venereal disease, 48; ulcers, 42; bronchitis, 34; dyspepsia and constipation, 31; diarrhoea and dysentery, 10; injuries, 19; pneumonia, 4. There were two deaths from pulmonary tuberculosis and malarial cachexia respectively.

Two hundred and thirty recruits were sent for examination, 155 were passed and 75 rejected.

Eighty men were boarded as unfit for further service.

Dengue.—Out of a total of 71 cases admitted to the General Hospital, 64 were in the months of June, July, and August. Among the police stationed in the Fort it was at one time exceedingly prevalent, hardly a man escaping, and it is interesting to note that out of the total (71), 45 cases were Sikh police stationed in the Fort, while from the Malay States Guides stationed at Sepoy Lines there were only two admissions; also, out of 11 European admissions, 8 were policemen living in the Fort. At the same time, although these cases were not specially isolated in hospital none of the other patients nor any members of the hospital staff contracted the disease. The above rather points to the conclusion that dengue is not infectious in the ordinary meaning of the word, and is in favour of Dr. Harris Graham's theory (mentioned in Manson's "Tropical Diseases") that, like malaria and yellow fever, dengue is communicated by a species of mosquito acting as an intermediary. No doubt the Fort moat forms an excellent breeding ground for many species of mosquitoes. There were no deaths from the disease.

Malaria.—As usual both in the general and pauper hospitals, malaria accounted for a large number of the admissions, and in many of these the diagnosis was confirmed by a microscopical examination. Out of a hundred consecutive fever cases, mostly Chinese pauper patients, I find that malarial parasites were found in 51. In 3 of these crescent bodies only were found; in 16 crescent and small signet ring parasites, in 24 small signet ring bodies only, in 4 benign tertian parasites, and in 4 benign quartan parasites. Out of the 51 patients in whom malarial parasites were found, 16 were found to have marked enlargement of the spleen, but in 20 of the others in whom no parasites had been found, the spleen was also found to be enlarged. From several of the latter specimens were obtained by splenic puncture and stained with a view of showing the Leishman-Donovan body, but in no case so far has this been discovered.

Operations.—The principal operations performed included: Excision of hip-joint, 1; amputation of thigh, 2; thoracotomy with excision of ribs for empyema, 3 (1 died); for abscess of liver, 5 (3 died); removal of tumour, 8; excision of lower jaw, 1; ligature of femoral artery, 3; trephining of skull, 2 (1 died); radical cure of hernia, 1; radical cure of hydrocele, 2; for strangulated hernia, 2 (1 died); external urethrotomy (Wheelhouse), 6; partial excision of rectum, 1; excision of eye-ball, 3; tracheotomy, 1; extraction of lens for cataract, 5; altogether 88 operations were performed under chloroform.

New Growths.—Seventeen cases of new growths were admitted into the general and pauper hospitals during the year. Specimens from seven of them were forwarded to the Cancer Research Society, but so far no report has been received as to their nature. The following are the probable diagnoses with the nationalities of the patients:—

Sarcoma of neck ...	5	all Chinese.
Sarcoma of orbit ...	1	Chinese.
Carcinoma of liver ...	1	Eurasian.
Carcinoma of pancreas	1	Eurasian.
Carcinoma of rectum	1	Hindu.
Epithelioma of penis	3	2 Hindus and 1 Chinese.
Epithelioma of lip ...	1	Malay.
Epithelioma of sebaceous cyst of scalp	1	Chinese.
Fibroma of breast ...	1	Chinese.
Fibroma of thigh ...	1	Sikh.
Hernia testis (probably gummatous) ...	1	Chinese.

Medico-Legal.—One hundred and thirty-six bodies were sent for *post-mortem* examination and inquest. I am glad to say that since the completion of the new "Morgue" in December, dead bodies are now sent there instead of to the hospital mortuary, a most desirable change for many reasons.

PRISON HOSPITAL.

Report by Dr. T. C. Mugliston, Colonial Surgeon.

During the year there were 4,705 admissions into prison, as against 3,674 for 1903, the daily average prison population being 421.92.

The admissions to hospital, excluding these detained under forty-eight hours for trivial complaints or observation numbered 155, giving an average daily sick of 6.97, and a daily sick rate of 1.65 of the prison strength.

There were 11 deaths in the prison during the year (five in the first three quarters and six in the last quarter) which is equivalent to a mortality of 7.09 per cent. of those admitted to hospital and 2.34 per mille of the admissions to prison.

The 11 deaths were due to the following causes:—

Malarial fever ...	...	...	...	1
Phagedæna ...	...	...	...	1
Debility ...	...	...	...	5
Tubercular phthisis ...	...	...	...	2
Chronic diarrhoea ...	...	...	...	2

Of the total admissions to the prison, 296 bore traces of or were actually suffering from venereal disease; 285 prisoners showed marks of a course of morphia injections, and 76 were confirmed opium smokers.

Vaccination of all prisoners who had not been previously vaccinated or revaccinated, or who bore no marks of a previous attack of small-pox, was performed this year on 423, with a percentage of 80.77 successful cases to total vaccinated.

Vaccine lymph from Saigon was used in all cases.

PAUPER HOSPITAL.

Report by Dr. G. D. Freer, Colonial Surgeon Resident.

Buildings.—New quarters for the senior dresser were built during the year. The attap roof of Ward 3 was replaced by a tiled one, the wooden supports replaced by brick pillars, and the floor renewed. The floors of Wards 2, 9, and 10 were reconcreted and cemented, and the wooden flooring of ward and verandahs in the pauper female ward replaced by solid concrete and cement.

Staff.—I took over charge from Dr. Jamieson on March 5th, on my return from leave. Assistant Surgeon C. T. de Souza was transferred to Malacca on July 23rd, being replaced by Assistant Surgeon C. J. Bateman on August 15th, Assistant Surgeon T. J. Scully acting in the interval.

Work Done.—The total number of patients treated was 4,010, of whom 400 remained from the previous year, the average daily sick 392.02 and the percentage of deaths to total treated 20.14, compared with 3,986, 364.59 and 17.76 respectively in 1903. Forty-one patients died within twenty-four hours and eighty within forty-eight hours from the time of admission.

In the female ward twenty-four patients remained in December 1903, and 121 were admitted during the year, making a total of 145.

Table A shows the admissions and deaths from the principal diseases for the past four years. It will be seen that there was a very considerable increase in the number of beri-beri cases, the admissions and deaths being nearly twice as many as in the previous year.

Table B shows the admissions and deaths of different nationalities for beri-beri, together with the rainfall for each month of the year. An inspection of this will show that contrary to the usual rule observed here, there was no increase in the number of cases admitted during the wet autumn months.

Fifty-two lepers were admitted during the year, of whom forty-six were transferred to the Leper Asylum.

TABLE A.

Table showing Admissions and Deaths from the Principal Diseases for the past Four Years at the Pauper Hospital, Penang.

Diseases.	1901			1902			1903			1904		
	Cases Treated	Deaths	Percentage	Cases Treated	Deaths	Percentage	Cases Treated	Deaths	Percentage	Cases Treated	Deaths	Percentage
Malarial Fever ..	440	68	15.45	418	39	9.33	342	24	7.01	334	36	10.77
Beri-beri ..	424	134	31.60	382	121	31.67	275	69	25.09	512	134	26.17
Dysentery ..	138	56	40.57	101	56	55.44	91	40	43.95	86	40	46.51
Diarrhoea ..	431	219	50.81	480	250	51.97	408	191	46.81	332	188	56.62
Debility ..	246	63	25.60	168	79	47.02	235	108	45.95	265	91	34.33
Pulmonary Tuberculosis ..	158	95	60.12	234	110	47.00	205	115	56.09	207	132	63.76
Anæmia ..	210	54	25.71	249	5	3.35	113	23	20.35	129	24	18.60
Venereal Diseases ..	711	38	5.34	653	32	4.90	681	26	3.81	581	35	6.02
Total Cases Treated, with Deaths ..	4,415	839	19.00	4,055	814	20.07	3,986	708	17.76	4,010	808	20.14

TABLE B.

Table showing the Admissions and Deaths, Pauper Hospital, Penang, for Beri-beri for the Year 1904.

Nationalities	January		February		March		April		May		June		July		August		September		October		November		December		Total	
	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths
Chinese ..	34	2	40	4	46	9	34	10	46	17	35	9	51	15	35	9	32	16	22	14	24	14	36	12	435	131
Klings ..	2	..	4	..	..	1	2	..	2	1	3	..	1	..	1	1	2	..	1	..	..	..	2	..	20	3
Rainfall ..	9.76		2.02		3.88		9.70		7.72		4.24		9.12		26.33		14.64		21.30		10.65		3.99		123.35	

PROVINCE WELLESLEY.

Report by Dr. W. H. Fry, Colonial Surgeon.

The estimated population for Province Wellesley for 1904 is 117,762, compared with 117,078 in 1903.

This is computed to be as follows:—

Europeans	186	Malays	69,370
Eurasians	304.5	Indians	19,919
Chinese	26,889.5	Other Nations	1,093

The *births* numbered 3,778, compared with 3,813 in 1903, being 32.08 per mille of population, compared with 32.58 in 1903.

The *deaths* were 3,392, compared with 3,279 in 1903, being 28.79 per mille of population, compared with 28.02 in 1903.

The number of deaths among infants from worms and convulsions continues very high, being no less than 741 from both causes for the entire province; in consequence of this a circular was in September issued to all police-stations and Penghulas detailing the chief symptoms and signs of worms, their causes, and treatment to be adopted. It is possibly in consequence of this that the death-rate from these parasites has in the northern district sunk from an average of 16 to 10 per month, and in the central district from 5 per month to 3 only. I have no doubt, however, that unless the circular is continually brought to notice the benefit will not be permanent.

The number of cases admitted to hospitals throughout the whole province was 1,588, with 208 deaths, compared with 1,469 cases and 241 deaths in 1903; this being a death-rate of 13.09 per cent. of admission to hospital, compared with 16.40 per cent. in 1903.

Zymotic Disease.—Comparatively few cases of small-pox occurred in the province during the year; this was anticipated from the number of cases (258) of this disease in 1903, it having been observed that an unusual number in one year is usually followed by one or two years' remission of the disease.

Some few cases of chicken-pox were reported, chiefly in the neighbourhood of Prai and Butterworth.

Dengue fever occurred throughout the province, but to no great extent, such few cases as sought admission to hospital did so for the rheumatic pains and other sequelæ of the disease.

The cases of small-pox numbered 6 with 2 deaths, and of chicken-pox 7 cases with no deaths.

Of the above, 9 were treated at the General Hospital, Butterworth.

One case of small-pox which afterwards proved fatal was too ill to be removed from his house when first seen. None of the persons affected had been revaccinated since infancy.

The nationalities of those affected comprised 7 Hindus and 6 Malays, 9 being males and 4 females.

GENERAL HOSPITAL, BUTTERWORTH.

Work Done:—

Remained from 1903	...	...	...	34
Admitted...	...	...	...	479
Discharged	...	...	...	391
Transferred	...	...	...	6
Absconded	...	...	...	17
Died	...	...	...	55
Remained at end of 1904	...	...	...	44

Of the 55 deaths, 7 occurred within twenty-four hours of admission.

Number of males admitted 426; died 428. Number of females admitted 53; died 7.

Average daily number of sick, males 42.35 and females 3.08.

Percentage of death to total treated was 10.72, or excluding those that died within twenty-four hours, 9.31.

The chief diseases treated comprised:—

Venereal Disease	...	58 with two deaths.
Ulcers	...	51.
Wounds and Injuries	...	42.
Diarrhoea	...	35 with 15 deaths.
Intermittent Fever	...	21.
Beri-beri	...	19 with 3 deaths.
Dysentery	...	9 with 3 deaths.

Operations.—Forty-nine operations were performed, chiefly of a minor nature.

Venereal Disease.—Of those admitted with venereal disease, eighteen stated that they had contracted the disease from Chinese or Japanese prostitutes residing at Campbell or Cintra Streets, Penang. I shall again refer to this subject later on.

GOVERNMENT DISTRICT HOSPITAL, BUKIT MERTAJAM.

Work Done:—

Remained from 1903	...	...	...	37
Admitted...	...	...	...	605
Discharged	...	...	...	474
Transferred	...	...	...	16
Absconded	...	...	...	11
Died	...	...	...	99
Remained at end of 1904	...	...	...	42

Of the 99 deaths, 17 occurred within twenty-four hours of admission. Average daily number of sick, males 46.82 and females .80.

The chief diseases treated included:—

Ulcers	...	99 with one death (from exhaustion).
Venereal Disease	...	79 with three deaths.
Beri-beri	...	54 with 21 deaths.
Malarial Fever	...	43 with 5 deaths.
Debility	...	47 with 8 deaths.
Rheumatism	...	37.
Dysentery and Diarrhoea	...	34 with 11 deaths.

PROVINCE WELLESLEY, SOUTHERN DIVISION.

Report by Dr. A. H. Keun, Colonial Surgeon.

The hospitals in the Southern Division of Province Wellesley are four in number, viz., the Government District Hospital at Sungai Bakap, and the three Estate Hospitals of Batu Kawan, Caledonia and Byram.

THE GOVERNMENT DISTRICT HOSPITAL, SUNGAI BAKAP.

During the year the general wards and outhouses were whitewashed and damar varnished, while the Colonial Surgeon's quarters were re-roofed and various petty repairs executed in all the hospital buildings.

An attempt was made at repairing the Contagious Disease Ward, but owing to the dilapidated condition of the building it was deemed advisable to include a new shed in next year's estimates.

Water supply remains as before, and is from surface wells, the drinking water well being within the hospital grounds, and the well for washing purposes in a Malay Campong within 200 yards of the hospital. The supply continues good and abundant.

Work Done.—On January 1st there were 23 cases under treatment in hospital. The admissions during the year amounted to 504, forming a total of 527 treated. This shows a distinct advance on the previous year, when 342 cases in all were treated. There were 54 deaths, giving a percentage of 10.24. This compares most favourably with the 56 deaths of last year, with its percentage of 16.37 to the total treated. Of these 54 deaths, 4 took place within twenty-four hours. The principal diseases treated were general and local injuries with 74 cases and 3 deaths (2 from exhaustion after severe scalds and 1 from pyæmia in a compound fracture of tibia case). Ulcers came next with 40 cases. As is usual in the province, diarrhoea accounted for a number of admissions, viz., 33, of whom 11 died, making a percentage to total diarrhoea treated of 33.3. This contrasted with the 66.85 per cent. (of deaths from diarrhoea to total diarrhoea treated) of last year shows a distinct improvement. Rheumatism of a subacute nature accounted for 28 admissions with no deaths. Malarial fever 29 (no deaths); anæmia, 30 cases with 7 deaths; debility, 17 cases with 3 deaths; leprosy, 11 cases; acute pneumonia caused 9 admissions with two deaths; and cirrhosis of liver 6 admissions with 2 deaths. From the returns of the Government District Hospital as well as from the returns of the various Estate Hospitals in the South Province, it will be seen that while diarrhoea continues, a factor accounting for large admissions and high mortality, there is on the whole a distinct improvement everywhere. The Tamils are especially susceptible to this disease. The gastro-intestinal canal appears to be the most vulnerable point of a Tamil. Various are the theories to account for the prevalence of the disease in the estates, and the water supply has again and again been held responsible for the disease. It was with the object of removing this source of danger that the Penang Sugar Estates erected water boilers and sterilisers to supply boiled and sterilised water to the coolies in all their estates in the province. In addition sterilisers were put up in the hospitals for hospital use. Boiled water has been in use since April, 1903. As a result this year saw a distinct decrease in the admissions from diarrhoea and dysentery. However, other factors besides the drinking water are responsible for bowel disorders. Among the most prominent I would place the long hours many of the coolies have in the fields exposed to all sorts of weather; the imperfect nutrition which of necessity many of them have owing to their having to cook their own dinners on their return home after 5 p.m. or so, when too exhausted and depressed, many prefer to feast on cakes and other innutritious food and filth sold in the Kuchis; but above all the very chilly evenings and nights play a most important part in filling our hospitals. Many of the coolies have

to sleep on the bare ground, sometimes on planks resting directly on the ground. In the early morning there is always a distinct fall in the temperature, and the damp cold ground extracts the heat from the bodies lying over it. This leads to a chilling of the system, which among the Tamils manifests itself by bowel disorders. But the predisposing causes are equally important. In many of the batches that have arrived, the managers state, are weak coolies who are unable to resist intestinal disease and who succumb to the first attack. To attempt to fix on one cause as the chief factor in the causation of this disease is impossible, and in the consideration of the causation of the disease the one fact must always be borne in mind that in the Tropics the bowels are the organs most susceptible to disorders, and such disorders are frequent from injudicious dietary, impure water, chills, exposure, or excessive exhaustion.

Hospital Staff.—I was in charge during the whole year. There was no Assistant Surgeon in the hospital during the whole year; third grade dresser S. Dorasamy did very good work, while Mr. A. Moses ably seconded him.

BATU KAWAN ESTATE.

Under the management of Mr. Lamb, a series of improvements was effected in the hospital buildings and outhouses. New roofing to all the wards (except the Chinese and Middle Wards) and new bertam sides were fixed. Improvements were also effected in the coolie lines. A few lines were rebuilt and an innovation of distinct value, viz., raised platforms for beds, &c., made. On September 18th, a gang of scavengers was organised to attend to the scavenging of the lines. Previous to this date the work was done by the general body of the coolies on Sundays. The estate employs free and indentured coolies, the latter include Tamils, Japanese and Chinese, each living in their own special lines at a distance from each other.

The strength of the working element is as follows:—

Indian Immigrants and Second Contract Coolies	162
Free Tamil Coolies	252
Javanese Coolies	52
Tamil Kongsis Coolies	350
Chinese	70
Total	886

The *water supply* continues the same as previous years, and was ample during the whole year. For the convenience of field workers fresh water is conveyed in boats daily to the fields for drinking purposes.

Hospital Staff.—Mr. Thomas continued as dresser in charge and his work generally was excellent. At present he has no assistant under him.

Tamil Patients.—On January 1st there were 14 Tamil patients. There were 239 admissions, making a total of 253 cases treated. There were only 3 deaths, one from tetanus, one from diarrhoea, and one from child-birth. Mortality, 1.18 per cent.

Chinese Patients.—On January 1st there were 5 Chinese patients. There were 36 admissions, making a total of 41. No deaths occurred among them in hospital.

Colonial Medical Reports.—No. 21.—The Straits Settlements (continued).

Javanese Coolies.—The year only saw 17 admissions with no deaths. Among the Tamils ulcer was the prevailing disease, 88 cases; febricula came next, 55 cases with no deaths; diarrhoea next, 28 cases with one death; chicken-pox, 14 cases no deaths; gonorrhoea, 10 cases.

Among the Chinese diarrhoea came first, 6 cases with no deaths; ulcers, 6 cases; anæmia, 4 cases no deaths; and among the Javanese coolies rheumatic pains accounted for 4 admissions, and diarrhoea for 3.

In studying the diseases occurring among the different nationalities, it is interesting to note that diarrhoea is prevalent among them all, though more so among the Tamils. That the Chinese should suffer shows that the water cannot be the only cause, as Chinese scarcely ever drink cold water. Hot water and hot weak tea are their universal drinks, even on the estates. The decline in the mortality of diarrhoea is well shown in the following table of mortality.

	1901		1902		1903		1904		
	Tamil	Chinese	Tamil	Chinese	Tamil	Chinese	Tamil	Chinese	Javanese
Diarrhoea	149	..	111	6	63	16	28	6	3
Death Percentage..	20·80		16·23		6·32		3·57		

CALEDONIA ESTATE HOSPITAL.

Various repairs were executed in the hospital buildings, but of a petty nature. The drainage of the hospital remains the same.

Water Supply.—Last year the boiling apparatus erected in Caledonia was completed, and this has since been in use during the whole year; about 9,000 gallons of water a day are boiled, and this water is conveyed in pipes to both the Caledonia and Victoria Kuchis, where it is stored in iron cisterns. These cisterns are cleaned about twice a month. Water is to be found in them at all hours of the day and night, ample in quantity for all the coolie uses. A few standpipes on the roadside gave a liberal supply. While the water supply is ample for all purposes, one cistern and one outlet or tap only for each Kuchi are wholly inadequate. The hospital steriliser is also in use for hospital purposes. There was a temporary stoppage from October to November, owing to leakages. The water used is obtained from the Jawi stream before it reaches the coolie lines.

Hospital Statistics.—During the year, 1,508 cases were treated in the hospitals, with 46 deaths, giving a percentage of 3·05. This contrasted with the 1,433 cases treated in 1903, with 75 deaths (5·23 per cent.), shows a distinct improvement in the mortality of the estate. The admissions to this estate hospital are chiefly from Victoria and Caledonia Estates, while Krian Brick Fields have supplied three patients. It is

interesting to contrast the various admissions with reference to nationalities, and the mortality of the separate estates. It is at once seen that Victoria Estate has supplied the largest number of Tamil patients and the highest mortality. This is accounted for by that estate receiving most of the newly arrived indentured coolies, and it is among such men, who arrive debilitated after their sea-voyage, and are put at once on field duty, unaccustomed to the climate and perhaps to the food, that gastro-intestinal diseases, which perhaps accounted for most admissions, do most mischief.

	Diarrhoea	Deaths	Dysentery	Deaths
Victoria Tamils..	145	6	53	6
Caledonia Tamils	44	1	20	3
Javanese.. ..	23	..	4	1
Bengalis	5	..	1	..
Total	217	7	78	10

In 1903, diarrhoea and dysentery, for both estates, accounted for 356 admissions, with 41 deaths (11·5 per cent.). In 1904, the total admissions for diarrhoea and dysentery were 295, with 17 deaths, giving a percentage of 5·7. This speaks in itself of the distinct improvement in the health of the estates, and shows that diarrhoea and dysentery are not the formidable diseases they used to be. Of these admissions for diarrhoea and dysentery, 118 cases came from Victoria, with 12 deaths, and 64 from Caledonia, with 4 deaths, the percentage of mortality being practically the same in the two estates (a little over 6 per cent.). The other diseases treated were local and general injuries, 263 cases; intermittent fever, 136; simple continued fever, 65; gonorrhoea, 84; ulcers, 44; bronchitis, 39.

Hospital Staff.—Dr. Ellery, the Estate Medical Officer, was in charge during the whole year. The staff remains the same as in the previous year, viz., two experienced dressers, one apprentice dresser, and a number of attendants.

The Cook-houses, which I referred to in last year's report, did excellent service this year. Every indentured coolie must take his meals here during his first month on the estate; afterwards he may continue at his own pleasure. There is an average of about ninety coolies at the tables. A cup of hot kanji is served out to the indentured coolies every morning before proceeding to the fields, for which a small charge of half a cent or so is made. This is a measure of great value, as otherwise the coolies would have to go out every morning into the cold, chilly air on an empty stomach, or after partaking of cold rice left over from the meal of the night before.

BYRAM ESTATE HOSPITAL.

Various petty repairs were done to the hospital buildings. The hospital latrines were improved. A new ward for infectious diseases was erected, and found serviceable in the measles outbreak this year.

Water Supply.—The hospital boiling apparatus was in constant use during the year. A new steriliser to

supply sterilised water to the whole estate was completed and was in use during the year with only a stoppage of a month. As mentioned in my last year's report, the water is brought up in water-boats from the Jawi Canal, near Caledonia.

Work Done.—On January 1st, 1904, there were 33 cases in hospital. During the year there were 690 Tamil admissions, making a total of 720 Tamils treated, and 305 Javanese, 1,025 in all. There were 23 deaths among Tamils, and 5 among Javanese, 28 in all, forming a percentage of 2.73 to the total treated. Last year there were 18 deaths out of 1,038 cases treated (or 1.73 per cent.).

The principal diseases treated were:—

	Tamil.	Deaths.	Javanese.	Death.
Diarrhoea ...	98	7	24	Nil.
Dysentery ...	76	7	27	1
Intermittent Fever	141	—	34	—
Bronchitis ...	24	—	1	—
Colic ...	12	—	7	—
Gonorrhoea ...	39	—	100	—
Ulcers ...	72	—	20	—
Local and General				
Injuries ...	51	—	10	—
Confinement ...	13	—	1	—
Chancres ...	23	—	7	—

The chief feature of the returns of the estate is the number of admissions from venereal disease, especially among the Javanese.

This year saw the commencement of Javanese immigrant labour. Four hundred and three coolies (males 222, females 181), arrived in the estate; of these 100 were found suffering from gonorrhoea and 7 from chancres, or 26.5 per cent. of all arrivals. Immediate steps were taken to examine all the arrivals to isolate the infected ones. While there has been a decrease in the admissions from diarrhoea and dysentery the death-rate has slightly increased, thus:—

1903—291 cases of diarrhoea and dysentery with 16 deaths.

1904—225 cases of diarrhoea and dysentery with 15 deaths.

KRIAN BRICK FIELDS.

The health of the coolies employed here has always been excellent, and this year only saw three admissions into hospital with no deaths.

Public Health.—This year has been practically free of all epidemics except little outbreaks of measles in Byram and Caledonia Estates, and in Batu Kawan.

Small-pox.—Not a single case occurred in the south province. It is, however, of very great importance to consider the vaccination question of the province. At the present time all children born in the district must be vaccinated within three months, failing compliance the parents are fined. But with a partial wandering population as we have in the province, where many natives migrate from place to place in search of work or to turn their hands to various occupations in various districts, children are often carried by their parents into other districts, and so pass out of the notice of the police and the public vaccinator. In this way

large numbers escape vaccination. Parents, while they are becoming conscious of the prophylactic action of vaccination and its beneficial effects in modifying cases of small-pox, still look for the most part on vaccination as a painful operation, and so avoid bringing their children up for vaccination. With such a rich soil for the small-pox germ, it is not surprising that when a few cases of small-pox occur the disease soon spreads and too often reaches epidemic proportions, and the mortality is proportionally high. The only remedy appears to me to lie in the hands of the police. The local police should at once communicate with the police of the district where the natives have gone to, and the information should be sent to the superintendent of vaccinations of that district. It would not be a difficult matter for the police to ascertain the districts the parents have gone to, from friends and neighbours, and in this way a great irregularity could be remedied. The subject of revaccination is also of great importance. While outbreaks of infectious diseases everywhere are always serious in an estate where natives are more intimately in contact with each other, outbreaks are of very great importance owing to their rapid spreading and high mortality. Compulsory revaccination is a necessity. New immigrants should be revaccinated prior to leaving their country or on arrival. In this way one source of danger can be obviated. There was a little epidemic of chicken-pox in Batu Kawan, where 14 cases were treated with no deaths. There were 26 cases of measles treated in Caledonia Estate Hospital, all from Victoria Estate. In Byram, 31 cases of measles were isolated and treated, as well as 12 cases of chicken-pox.

Another subject of very great importance to the health of the community is the prevalence of venereal diseases among the natives. Unfortunately, hospital statistics will not emphasise the danger, as natives do not care to come into hospital to be treated for such diseases, which they know are not immediately fatal, while native treatment has apparently some beneficial results on them. Wandering prostitution is, in my opinion, chiefly responsible for this prevalence. Only the Japanese and some Chinese (Macao) prostitutes reside in recognised brothels. There are a very large number of Tamil and Malay prostitutes who wander from village to village, residing a few days only at each place, and shifting from street to street, and so avoid the complaints of their being nuisances being made by neighbours. Most of these women suffer from venereal diseases, and they are the means of spread of these loathsome diseases. Apparently there is no remedy short of special legislation.

The Sanitary Department is doing slow and steady work in the south province with corresponding improvement in the sanitation of the villages.

APPENDIX D. MALACCA.

Report by Dr. F. B. Croucher, Colonial Surgeon.

The general health of the Settlement during 1904 was fairly satisfactory. With an estimated population at the end of the year of 98,878, the death-rate was

32.95 per mille against 33.81 per mille last year, and 31.19 per mille in 1902. The deaths in children under one year of age numbered 851, nearly 25 per cent. of the total.

The chief causes of death were returned as:—

Fever	1,307	against	1,405	last year.
Convulsions	574	„	735	„
Phthisis	168	„	163	„
Intestinal Diseases	261	„	116	„
Beri-beri	284	„	184	„
Debility after Fever	97	„	—	„
Old Age	274	„	252	„
Pneumonia	49	„	—	„
Phagedæna	19	„	—	„

The total number of births during 1904 was 3,380 (males 1,741, females 1,639), compared with an average of 3,579 during the previous ten years. This gives a birth-rate of 34.19 per mille for the year, against an average rate of 38.34 per mille for the previous decade. Six hundred and thirty-five births (males 344, females 291) were registered within municipal limits.

The total number of deaths registered in the Settlement was 3,259 (males 2,042, females 1,217), as against 3,332 (males 2,008, females 1,324) in 1903, giving a death-rate of 32.95 per mille. Of the deaths, 672 occurred within municipal limits with an estimated population of 15,711, and 2,587 in the country districts. This gives a death-rate for the town of 42.77 per mille, and country 31.10 per mille.

The following were given as the chief causes of the deaths within municipal limits:—

Beri-beri	...	100	against	39	in 1903.
Fever	...	96	„	182	„
Phthisis	...	53	„	61	„
Convulsions	...	75	„	150	„
Diarrhœa	...	91	(chiefly in young children).		
Dysentery, 45, old age 64, pneumonia 26, premature birth, 18.					

The most noticeable feature in these figures is the increase in the number of deaths from beri-beri.

Small-pox.—One hundred cases of small-pox were recorded in the Settlement during the year with 7 deaths. The disease was generally of a very mild type. Fifty-nine cases occurred in persons previously vaccinated.

Dysentery.—Two outbreaks of dysentery of a very severe type occurred, one in Alei, about 5 miles from town, the other at Alor Gajah. Both were due to a shortage of drinking water, following on a period of very dry weather. At Alei, 52 cases were reported with 27 deaths. This mukim lies very low near the coast, and it is said that deep wells cannot be sunk as the water is saltish. The water for drinking is derived chiefly from shallow surface wells which are easily infected. Dresser Hosie was stationed at Kandang during the outbreak and did his best to aid the people, but I do not think they were ever convinced that the disease was due to the defective water supply. At Alor Gajah there were 27 cases reported with 8 deaths.

There was also a large increase in the number of patients suffering from beri-beri, the admissions being

437, as against 251 cases in 1903. The number of deaths from the disease was 89, against 64 last year.

The other principal diseases treated were malaria, 296 with 5 deaths; rheumatism, 174; diarrhœa, 85 with 24 deaths; dysentery, 74 with 31 deaths; phthisis, 61 with 28 deaths; phagedæna, 49 with 20 deaths; pneumonia, 26 with 15 deaths; syphilis, 85 with 2 deaths; injuries, 99 with one death; nephritis, 24 with 6 deaths; ulcers, 737.

Eighteen prostitutes suffering from venereal disease were admitted during the year.

Operations.—Sixty-nine operations were performed with 4 deaths (amputation of thigh, amputation of leg, resection of intestine for strangulated hernia, and gastrostomy for stricture of œsophagus).

Necropsies.—Ninety-four were made during the year.

GAOL HOSPITAL.

The general health of the prisoners, with the exception of an outbreak of dysentery in October, was satisfactory. The average daily number of prisoners was civil, 5.54, and criminal, 46.56.

Buildings, &c.—The wells were closed early in the year and water from the Ayer Keroh Reservoir laid on. Ventilators were fixed in the lower part of all the cell doors.

Patients in Hospital:—

Remained	Nil
Admitted	30
Discharged	24
Died	6
Transferred	Nil
Remaining end of the year	Nil

Thirty-seven prisoners suffering from beri-beri who had been sent from Singapore in 1903, were still remaining at the beginning of the year. Of these, 3 died, 3 were discharged, and the remainder, much improved in health, were sent back to Singapore. Twenty-nine more were sent here in October. Of these, 2 died, 4 were discharged, and 23 remained at the end of the year.

There was an outbreak of dysentery in October affecting ten of the prisoners, the dresser in charge, and one of the warders. The first case attacked succumbed after two days' illness, and at the *post-mortem* examination there was found extensive gangrene of the large intestine. All the other cases did well with the exception of the warder, who was treated at his own home and died after about four weeks' illness.

The origin of the outbreak remained a mystery; it could not with any likelihood be put down to the water or food supply or to defective sanitary arrangements. Dust is given as one of the means by which dysentery was conveyed. Shortly before the outbreak, owing to the collapse of one of the buildings, excavations were made in the prison yard, and a large amount of sand and sub-soil water was thrown up on to the surface. If any dysenteric pronouncing organisms were included it is possible that this was the way in which the disease was produced.

Colonial Medical Reports.—No. 22.—Somaliland Protectorate.

MEDICAL REPORT FOR THE YEAR 1905.

METEOROLOGICAL RETURN FOR THE YEAR 1905.

		TEMPERATURE					RAINFALL		WIND		Remark	
		Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction		Average Force
January	..	155° F.	..	85° F.	62° F.	23° F.	70° F.	·14	59	N.E.	Light	Records taken in shade. except solar maximum, during Jan., Feb., Mar., Nov., Dec. During May records taken indoors. During July and August taken indoors in draught of air. Records from September taken in shade.
February	..	150	..	86	70	16	77	·075	68	N.E.	Moderate	
March	..	160	..	89·5	75	14	80	·605	76	N.E.	Light	
April	..	..	..	93	74	19	84	1·05	76	N.E.	Light
May	..	140	..	96	80	16	88	·02	73	S.W.	Light	
June	..	140	..	99	84	15	92	..	43	S.W.	Strong	
July	..	144	..	113	90	13	97	..	52	S.W.	Strong	
August	..	140	..	112	85	27	97	·01	35	S.W.	Strong	
September	..	142	..	111	77	34	88	·21	45	Variable	Light	
October	..	140	..	95	73	22	84	..	73	N.E.	Strong	
November	..	160	..	93	69	24	77	·10	60	N.E.	Strong	
December	..	165	..	86	61	25	69	·41	60	N.E.	Strong	
Mean of Year	..	..	..	95·7	75	20·7	92·1	·23	60	N.E.	..

RETURN OF THE DISEASES AND DEATHS IN 1905 AT THE FOLLOWING INSTITUTIONS: BERBERA, BULHAR AND ZEYLA HOSPITALS.

	Cases.	Deaths.
GENERAL DISEASES—		
Small-pox ..	314	144
Febricula ..	3	..
Dysentery ..	115	1
Malarial Fever—		
(a) Intermittent ..	1,007	..
(b) Remittent ..	117	..
Erysipelas ..	3	..
Tubercle ..	36	1
Chicken-pox ..	9	..
Syphilis—		
(a) Primary ..	25	..
(b) Secondary ..	51	..
Gonorrhoea ..	327	..
Scurvy ..	56	..
Rheumatism ..	255	..
Rheumatic Fever ..	1	..
New Growths—		
Non-malignant ..	4	..
Malignant ..	1	..
Anæmia ..	34	1
Debility ..	67	1
Whooping Cough ..	2	..
LOCAL DISEASES—		
Functional Nervous Disorders—		
Paralysis ..	7	1
Epilepsy ..	6	..
Neuralgia ..	65	..
Hysteria ..	1	..
Neurasthenia ..	6	..
Diseases of the—		
Eye ..	181	..
Ear ..	199	..
Nose ..	9	..
Circulatory System ..	21	1
Respiratory System ..	579	1
Digestive System ..	990	1
Lymphatic System ..	27	..
Urinary System ..	10	1
Male Organs ..	31	..

Diseases of the—	Cases.	Deaths.
Female Organs ..	18	..
Organs of Locomotion ..	45	..
Cellular Tissue ..	78	1
Skin ..	3,798	1
Injuries, General ..	5	..
Injuries, Local ..	413	..
Surgical Operations ..	170	..
Poisons ..	7	..
Parasites ..	18	2

Estimated Population for the Year 1905.—The population during 1905 numbered—52 Europeans, 300,000 Africans, 200 Indians, 100 mixed and coloured persons. Except from an increase of 3 Europeans the number of people was the same as that for 1904.

The population at the present time is probably nearly stationary, as the outbreak of small-pox in 1904-5 and the emigration decrease are compensated for by the birth-rate. An estimation of the birth-rate as regards the coast towns shows this to be 10 per cent. among the married women. No figures are obtainable for the more remote portions of the country inland.

Death-rate.—No records on this are available.

Prevalence of the Disease at Different Seasons.—The table of statistics as regards the prevalence of the disease at the different seasons is apt to mislead, unless it is kept in mind that practically the entire native population emigrates into the interior during the extreme heat of the summer, leaving only those who are in fixed employment on the coast. The population able to present themselves at the hospitals thus varies from 20 to 30,000 during the winter, to 3 to 4,000 during the summer, and of this latter number the patients are confined to those drawn from the adult and more physically strong of the population.

Colonial Medical Reports.—No. 22.—Somaliland Protectorate
(continued).

As regards the periods when sickness most generally prevails the spring and autumn are the more trying to the Somali natives. This is accounted for by the lack of provision for any variations in the temperature as regards clothing. The native dress remains the same at all seasons, and is of cotton only, while a blanket for use at night is not a common possession.

Among the Europeans resident in the country one observes that definite organic disease is uncommon, and except for the milder types of malarial fever and diarrhoea their diseases are entirely confined to the neurasthenic type, predisposed to by the physical conditions imposed on them by residence in such a hot climate.

In character the diseases of the country generally are not of an aggravated type, though undoubtedly the neurasthenic class of patients require invaliding in many cases before recovery takes place.

Relative Mortality at the Different Seasons.—January, February, and March are the months in which most sickness prevails, closely corresponding to the rainy season of the year as regards the coast.

Causes Affecting Public Health.—Meteorological: The hot, violent sandstorms which continue during the summer do undoubtedly lower the physical condition of both Europeans and natives alike. These hot winds seem to be responsible for most of the anæmic and debility cases. As regards other causes at work besides the meteorological, the general health is affected by the almost absolute absence of fresh vegetables among almost all classes over the greater part of the year. The natives do not cultivate, but live on camel's milk and meat, and occasionally on mutton. Camel's milk is also the chief source of salts in their food.

The poor Somali lives, therefore, very much, as regards his diet, on a par with some of the South American tribes, whose diet is almost exclusively animal, except for matté, a plant allied to and used as tea. Certainly directly the Somali is deprived of camel's milk he very quickly develops scorbutic symptoms. The natives as a race are total abstainers from alcohol, a very considerable asset as regards their physical condition.

Remarks on the Particular Diseases which have occurred during the Year.—*Dysentery:* All the cases which have come under my personal notice have been of an exceptionally mild type.

Malarial Fever.—The hospital figures show remittent fever on the coast to be exceptional. Of the different towns, Berbera is the one most affected by intermittent fever, probably due directly to the sufficiency of fresh water allowing a surface drainage and breeding ground for mosquitoes on the foreshore of the harbour. Mosquitoes seem to entirely disappear during the very hot months—that is, from May to October. Except for imported cases the towns of Bulhar and Zeyla are almost entirely free from malaria the whole of the year, due to the scarcity and expense of water leading to care and prevention of waste.

Insanity.—Cases of insanity of any of the recognised types are almost unknown, and but for syphilis

most of the predisposing causes are absent. Cases of monomania, of which a few exist, do not readily become subjects for treatment at the protectorate hospitals.

Diseases of the Skin.—The large number of skin diseases recorded are accounted for under ulcers chiefly, these ulcers being on the legs and ankles of badly nourished subjects, and are of the usual tropical type.

A curious dermatological phenomenon is presented among those of the European population who are for any length of time resident in the country; namely, a redness or hyperæmia, which remains constant, and almost amounts to a staining of darkish red colour, over the *hypothenar palmar* surface of both hands. The condition was first brought to my notice by Mr. H. E. S. Cordeaux, C.B., who has had several years' residence in the country. No actual swelling or other symptoms seem to be related to this condition.

Poisons.—Except in one case, where a vegetable poison was taken by a native as a purgative, which caused death, with symptoms of acute gastric and renal irritation, no cases have occurred except bites or stings of insects.

General Sanitary Condition of the Protectorate.—Probably few other countries have so great a natural protection for the preservation of the public health as exist here. The dry heat and lack of thick vegetation, with the fierce sand storms which sweep the country, dry and cover up any animal or vegetable refuse very much in the same way as occurs in the desert proper. Drainage as such practically does not exist, nor in the ordinary sense is it necessary where the dry earth system exists naturally in so high a degree of perfection.

As regards water supply, only one town, that is, Berbera, can be said to have a moderately good supply service. The water comes from springs at a temperature on leaving the rock of about 100° F., and contains an excess of chlorides, but it is not unwholesome after standing for twenty-four hours to cool and deposit its sediment.

The other towns of Bulhar and Zeyla are supplied from very indifferent brackish wells, mostly situated at a distance from the actual vicinity of the dwellings.

Inland, water of a very fair quality is obtainable in small quantities.

Overcrowding.—This does not exist, as the population is a nomadic one, travelling over its tribal area and living under mat or grass shelters only.

Vaccinations.—The number of vaccinations performed during the year was 1,650; of these, 496 were successful, while in the case of 804 the result was unknown, leaving 350 as unsuccessful in result. It is probable that at the present time about 20 per cent. of the population has been vaccinated; about 5 per cent. of the tribes in the more immediate vicinity to our stations, and with whom we come more directly in contact, have the marks of small-pox.

General Observations.—An attempt has been made to give such demonstrations and instruction in General Hygiene as has come within the scope of interest of the more highly educated native teachers and other residents. Native masons, carpenters and artisans have been approached on matters dealing

more especially with their respective work, in its relationship to the public health.

Ventilation and such like matters in regard to stone-built houses, and the dangers associated with faulty drainage and water contamination have been fully dealt with.

There can be no question as to the fact that phthisis does occur in the country, and I am of opinion that this disease is slowly extending. An isolation hospital

is in course of being built expressly for these cases, in the neighbourhood of Berbera.

At the present time a collection is being made of the stinging flies throughout the area accessible to Europeans; this it is hoped may prove a practically complete one when forwarded to the British Museum, for whom the collection is being made.

There have been no cases recorded of any disease deserving special mention, or report.

Colonial Medical Reports.—No. 23.—Gambia.

MEDICAL REPORT FOR THE YEAR 1905.

PATIENTS IN HOSPITAL.

	Remaining in Hospital Dec. 31st, 1904	Admitted during the Year	Died	Remaining in Hospital Dec. 31st, 1905
Europeans ..	Nil	17	2	Nil
Natives ..	16	436	27	18
Civil Force ..	1	45	2	2
Syrians ..	Nil	29	2	Nil
W. A. F. F. ..	7	79	1	4
Total ..	24	606	34	24

The deaths were due to the following diseases:—Beri-beri 1, blackwater fever 1, bronchial asthma 1, broncho-pneumonia 1, burn 1, acute gastritis 1, chronic pyæmia 1, chronic peritonitis 1, cardiac disease 2, chronic bronchitis 2, cerebral congestion 1, dysentery 1, debility 2, hospital gangrene 1, malignant fever with hyperpyrexia 1, meningitis 1, marasmus 1, phthisis 1, phagadoena 1, inanition 1, pneumonia 1, rheumatic fever 1, sleeping sickness 2, senile decay 2, starvation 2, tetanus 2, renal disease 1, acute bronchitis, 1.

The prevailing diseases were the following:—Intermittent fever, remittent fever, conjunctivitis, catarrh, dyspepsia, orchitis, œdema, whitlow, febricula, rheumatism, bronchitis, pneumonia, diarrhœa, abscess, ulcers, boils.

Of the rarer diseases met with there were guinea worm, syphilis, sleeping sickness, gout, leprosy, beri-beri, tetanus.

The following table shows the number of cases of illness and invalidings among Europeans during the past five years and the number resident in the colony for each year.

Europeans	1901	1902	1903	1904	1905
Number of Residents ..	88	98	105	100	114
Treated	89	26	47	42	43
Died	4	2	2	Nil	1
Invalided	3	2	2	Nil	1
Malarial Fever Cases ..	54	11	15	24	16
Blackwater Fever ..	..	..	..	..	6

The diseases suffered from were the following:—Biliousness, cellulitis, pleurisy, ulcer, febricula, and remittent fever.

Years	Total Deaths	Rate per 1,000	Deaths under 5 Years	Rate per 1,000
1901	340	38·63	137	15·56
1902	266	30·22	112	12·72
1903	315	35·79	130	14·77
1904	303	34·40	124	14·07
1905	299	33·95	117	13·29

The statistics of population for the year 1905 are:—Europeans 114, Africans 8,807; Increase 14 Europeans.

There has been no structural building or alteration during the year.

The European Staff remains the same.

The tank supply of water has been ample, although the two largest tanks are leaking.

Receipts.

Sale of Medicines and paying patients	£82 7 1
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Colonial Medical Reports.—No. 23.—Gambia (continued).

RETURN OF DISEASES AND DEATHS IN 1905, AT THE
Colonial Hospital, Infectious Hospital, and Gaol Infirmary.

GENERAL DISEASES.				GENERAL DISEASES—continued.			
	Admis- sions.	Deaths.	Total Cases Treated.		Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism	—	—	—	Varicella	—	—	—
Anæmia	—	—	—	Whooping Cough	—	—	—
Anthrax	—	—	—	Yaws	—	—	—
Beri-beri	1	1	1	Yellow Fever	—	—	—
Bilharziosis	—	—	—				
Blackwater Fever	—	—	—				
Chicken-pox	—	—	—				
Cholera	—	—	—				
Choleraic Diarrhoea	—	—	—				
Congenital Malformation	—	—	—				
Debility	8	2	9				
Delirium Tremens	—	—	—				
Dengue	—	—	—				
Diabetes Mellitus	—	—	—				
Diabetes Insipidus	—	—	—				
Diphtheria	—	—	—				
Dysentery	4	1	4				
Enteric Fever	—	—	—				
Erysipelas	—	—	—				
Febricula	18	—	18				
Filariasis	—	—	—				
Gonorrhoea	2	—	2				
Gout	1	—	1				
Hydrophobia	—	—	—				
Influenza	4	—	4				
Kala-Azar	—	—	—				
Leprosy	—	—	—				
(a) Nodular	—	—	—				
(b) Anæsthetic	—	—	—				
(c) Mixed	—	—	—				
Malarial Fever—	—	—	—				
(a) Intermittent—	50	—	50				
Quotidian	—	—	—				
Tertian	—	—	—				
Quartan	—	—	—				
Irregular	3	2	3				
Type undiagnosed	—	—	—				
(b) Remittent	16	—	16				
(c) Pernicious	—	—	—				
(d) Malarial Cachexia	—	—	—				
Malta Fever	—	—	—				
Measles	—	—	—				
Mumps	—	—	—				
New Growths—	—	—	—				
Non-malignant	—	—	—				
Malignant	—	—	—				
Old Age	2	2	2				
Other Diseases	—	—	—				
Pellagra	—	—	—				
Plague	—	—	—				
Pyæmia	—	—	—				
Rachitis	—	—	—				
Rheumatic Fever	1	1	1				
Rheumatism	15	—	15				
Rheumatoid Arthritis	—	—	—				
Scarlet Fever	—	—	—				
Scurvy	—	—	—				
Septicæmia	1	—	1				
Sleeping Sickness	2	—	2				
Sloughing Phagedæna	—	—	—				
Small-pox	—	—	—				
Syphilis—	2	—	2				
(a) Primary	—	—	—				
(b) Secondary	—	—	—				
(c) Tertiary	—	—	—				
(d) Congenital	—	—	—				
Tetanus	4	2	4				
Trypanosoma Fever	—	—	—				
Tubercle—	—	—	—				
(a) Phthisis Pulmonalis	—	—	—				
(b) Tuberculosis of Glands	—	—	—				
(c) Lupus	—	—	—				</

Expenditure.

Salaries and Allowance ...	2,427	0	9
Drugs and Maintenance ...	561	10	7
	£2,988	11	4

Among the 35 European officials there has been no serious illness.

The following diseases are recorded:—remittent fever 11, cellulitis 1, pleurisy 3, biliousness 1, febricula 3. Accidents: dislocated shoulder 1, injury to foot 1, strain 1.

Of the non-official Europeans one was invalided to Europe for persistent anæmia following fever.

Other cases were:—fever 16, anæmia 1, nephritis 1, catarrh 1, blackwater 3, biliousness 1, abscess 2; also some slight wounds.

There has been great improvement in the health of the prisoners in the Bathurst Goal. Only one case of beri-beri occurred, and this was undergoing punishment before the improvements were carried out (1903).

The prisoners are now more than ever employed outside the gaol, and also they are available for work on the new Victoria Recreation Ground (late McCarthy Square). This has had much to do with their good health.

The water supply is the same as before and has been ample.

Fortnightly meetings of the Board of Health took place regularly. Thirty labourers in the rains and twenty at other times are continually employed in sweeping and scavenging the town. Three carts and three horses are in constant use. These carts removed 4,780 loads of refuse, &c., also 311 loads of tins, bottles, &c.

There were 91 "Abatement of Nuisance" notices served, also 4,790 house-to-house visits, but no summonses nor convictions. Thirty labourers were employed.

Vaccinations were carried out regularly; 987 vaccinated, of which 968 were successful. This is more than double the number of the preceding year, and .01 unsuccessful only. Practically all were children or young adults. The same lymph as used the year before has proved very successful.

The efforts at vaccination in the Protectorate have

been met with no response or appreciation by the natives.

The name of "McCarthy Square" is now altered to that of "Victoria Recreation Ground." During the rains of the year (1905) the square was enclosed with an iron railing. Gates were placed in the centre of each side. A macadam path near the railing is being carried round the Square and shrubs and plants in tubs are being planted. Eighteen garden seats (to hold four each) have also been provided; also a lawn mower.

Jubilee Hospital Fund.

Dr. Total Receipts ...	£801	3	3
Cr. Total Expended ...	469	5	11
Balance Transferred to McCarthy Square Manage- ment Fund ...	331	17	4

Signed F. A. BALDWIN,
Acting Senior Medical Officer,
February 28th, 1906.

In response to an official request Dr. Hopkinson states:—Although I am afraid that the above remark still holds good for the greater part of the Protectorate, there is at least one district (Kwinella and neighbourhood) where vaccination is really appreciated, and where genuine disappointment has been shown when I have visited that part without enough lymph to vaccinate all who apply. Again this year in the Upper River I found the same attitude. In other parts, however, hitherto my only vaccinations have been done when with His Excellency, his support and countenance having great weight with the people.

In response to an official request concerning the number of children vaccinated Dr. Hopkinson replied:—In 1905, 226 children were vaccinated by me in the Protectorate—in the McCarthy Island and Upper River Districts; and 265 by Dr. Franklin in the South Bank and Kombo. Total for 1905, 491. In 1906 I have vaccinated 85 at Willinghamra and Kwinella. Total for 1905-6 up to date, 576.

In several places, notably Kwinella, Batelling and in Dembo Danso's District in the Upper River, I could have done at least twice as many vaccinations had lymph been available.

Colonial Medical Reports.—No. 24.—Southern Nigeria.**MEDICAL REPORT FOR THE YEAR 1905.****EUROPEAN MEDICAL STAFF.**

THE medical staff consists of 35 medical officers and 7 nursing sisters. During 1905 one medical officer was permanently invalided, another was murdered, and the Principal Medical Officer retired on a pension.

HEALTH.

The health of the Europeans throughout the Protectorate has been fairly satisfactory.

EUROPEAN POPULATION.

The average European population was 533, viz., 494 males and 39 females.

EUROPEAN DEATH-RATE.

There were 12 deaths during the year, viz., 5 officials and 7 non-officials. In addition, 3 officials and 3 non-officials died a short time after their arrival in England of diseases contracted in the Protectorate. The death-rate calculated on those who died in the Protectorate is at the rate of 22.5 per thousand, or including the 6 that died in England, 33.7 per thousand.

When comparing the death-rate with that of England, it is well to note that there are no deaths in infancy or from old age.

CAUSES OF DEATH.

Of the 12 deaths that occurred in the Protectorate, 7 were due to blackwater fever, 1 to malarial fever, 1 to cardiac failure in gastritis, 1 to apoplexy, 1 to accidental drowning, and 1 was murdered by the natives.

INVALIDINGS.

Forty-three European officials and 45 non-officials were invalided.

Of the 43 officials 6 were permanently invalided out of the service, and another died within a short time of his arrival in England. Of the 88 invalided, 50 returned to Europe and 38 were sent for a sea trip. This gives an invaliding rate of 150 per thousand. Undoubtedly a high percentage, but probably the means of reducing the death-rate, which compares favourably with previous years.

DEATH-RATE AND INVALIDINGS COMPARED WITH THOSE OF 1904.

In 1904 the average resident European population was 500, deaths 19 (including 2 in England), invalidings 42.

In 1905 the population was increased by 33, the deaths, including the 6 that died in England, are

1 less than in 1904, and the invalidings show an increase of 46 over those of 1904.

PREVALENT DISEASES.

Europeans suffered principally from malaria and disorders of the digestive system. The disorders of the digestive system were, as a rule, functional. A large percentage of Europeans suffered from some form of dyspepsia. This, in my opinion, is due to one of the following causes: (1) General deterioration in health; (2) bad cooking; (3) inappropriate foods. It frequently happens that a person when he first begins to suffer from dyspepsia considers it trivial and not necessary to consult a doctor about, and it is not till the complaint has become more or less chronic that he seeks the advice of a medical man.

FILARIAL INFECTION.

I regret to say I came across two fresh cases of filarial infection amongst the Europeans. These filariæ are about $\frac{1}{16}$ th of an inch in length, and millions are, as a rule, present in the circulation. A large number of natives suffer from filariæ, and it is from them or from the infected European that the mosquito becomes infected, and he in his turn infects the European. All resident Europeans are now aware, I presume, of the mosquito theory of malaria, and a large number also know of the mosquito theory of filariæ, yet in spite of this you find Europeans who do not consider it necessary to use a mosquito curtain in districts where the mosquitoes though present are not sufficiently numerous to be troublesome. The question arises as to what is to be done with a European infected with filariæ. I am of opinion that he should not be allowed to remain in a place where there is a European reservation.

QUININE.

There appears to be a growing tendency amongst some European residents to underrate the value of quinine as a prophylactic against malaria. They become imbued with the idea that certain ailments, such as loss of memory, neuritis, dyspepsia, blackwater fever, are caused by its use. This idea is, to a certain extent, fostered by some medical men in England occasionally attributing a West African's ill-health to the taking of too much quinine.

After many years of experience, I am of opinion that the above-mentioned ailments are much more likely to be caused by malarial infection than by the use of quinine as a prophylactic, and those, particularly the more recent arrivals, who neglect to take quinine as a prophylactic because of its possibly causing loss of memory, &c., are not acting with justice to themselves or their employers.

CALABAR (EUROPEANS).

The health of Calabar as regards serious illnesses was good, though there was an increase in the number of those treated for slighter ailments. Many of the residents now realise the fact that a very narrow margin separates the slight fever from the malignant one, the former being as a rule a milder type of the latter, and they send at once for a medical man when they become ill, instead of waiting to see what will happen.

EUROPEAN HOSPITAL.

I cannot speak too highly of the value of the European hospital to the residents, nor of the great assistance the nursing staff under Miss Graham is to the medical officers.

A patient who is at all seriously ill is attended day and night by one of the European sisters, and it is to that as much as anything else that I attribute our successful treatment of hospital patients. I strongly recommend such a system to those hospitals in West Africa where European nurses are not employed on night duty.

CASES ADMITTED TO EUROPEAN HOSPITAL.

One hundred and seventy cases were admitted during the year, with 2 deaths. Of the 2 deaths 1 died of blackwater fever, and the other had been brought from the Cross River suffering from malignant malaria. He was in a moribund condition on admission, and died within a few hours.

CALABAR GAOL.

The health of the prisoners during the first six months of the year was bad, and the death-rate high. The majority of the deaths occurred amongst those who were old and decrepit. A type of dysentery, which, with few exceptions, was invariably fatal when it attacked those past middle age was responsible for a large number of the deaths. All known forms of treatment and the best possible nourishment appears to be of little or no use in these cases. The growing adult does well in prison, and as a rule puts on weight. The health of the prisoners during the second six months of the year was good.

LUNATIC ASYLUM.

The asylum is at present only used for criminal lunatics. Accommodation is provided for the lunatics in three mud and wattle houses. Each house contains 4 rooms. In addition, there are 3 isolation wards made of cement blocks. I am of opinion that more permanent buildings than the present mud and wattle ones should be provided, and that a wall instead of the present wire fence should separate the males from the females.

ST. MARGARET'S NATIVE HOSPITAL, CALABAR.

There were remaining from 1904, 42 cases, and 767 were admitted, making a total of 809 intern patients treated. Thirty-nine deaths occurred amongst those treated. Twenty-two major operations were performed, with 3 deaths.

MAJOR OPERATIONS PERFORMED, 1905.

	No.	RESULT	
		Successful	Died
Amputation of Limbs	4	4	—
Excision of Breast	1	1	—
Excision of Tumours	3	3	—
Craniotomy	1	—	1
Elephantiasis	4	4	—
Radical Cure of Hernia	6	5	1
Hernia (Strangulated)	1	—	1
Hip-joint	1	1	—
Plastic	1	1	—
	22	19	3

The case of strangulated hernia was virtually moribund when operated upon. In addition to the above, I operated successfully on a European with *supra-hepatic abscess*.

The two Roman Catholic Sisters are doing good work at the native hospital. Their principal duty at present is to attend to female patients and to assist the medical officer in his gynaecological work.

EXTERN PATIENTS.

Seven thousand six hundred and eighty-two extern patients were treated. I attach a table of cases treated.

WATER SUPPLY.

The water continues to maintain its high standard of quality, and is practically unlimited. I attach analysis of same. The water has been laid on to the various trading factories, and for the future they will be able to use this water instead of rain as heretofore.

SMALL-POX.

I am pleased to be able to report that no case of small-pox occurred in the Calabar district. A new contagious diseases hospital has been built, and will be open to patients next year.

VACCINATION.

Twenty-four thousand and seventy-nine successful vaccinations are reported as having been performed throughout the Protectorate.

METEOROLOGICAL RETURNS.

(All temperatures are recorded in degrees Fahrenheit.)

At Calabar the maximum shade temperature recorded was 92.71, and the minimum 70.67. The former was in February and the latter in August. The highest monthly mean temperature was 84.37 in March, and the lowest 77.15 in August. The mean temperature for the year being 81.21. The total rainfall was 167.39 inches. The mean degree of humidity, 84.29.

BONNY.

The maximum shade temperature was 96·21 recorded in February, and the minimum shade temperature 62·13, also in February. The highest mean monthly temperature was in March, viz., 81·66, and the lowest 76·63 in August. The mean temperature for the year was 79·58. The total rainfall was 167·75 inches. The mean degree of humidity, 83·78.

SAPELE.

The maximum shade temperature was 90·32 recorded in February, and the minimum 70·42, also in February. The highest monthly mean temperature was 79·97 in March, and the lowest 75·15 in August; the mean temperature for the year being 77·86. The total rainfall was 116·25 inches. The mean degree of humidity, 84·55.

ASABA.

The maximum shade temperature was 96·19 recorded in March, and the minimum 67·83 in December. The highest mean monthly temperature was 80·88 in March, and the lowest, 75·79 in July. The mean temperature for the year was 77·89. The total rainfall, 59·42 inches. The mean degree of humidity, 81·88.

BENDE.

The maximum shade temperature was 91·29 recorded in March, and the minimum 67·87 in December. The highest mean monthly temperature was 80·29 in March, and the lowest, 74·87 in August. The mean temperature for the year was 77·21. The total rainfall, 74·67 inches. The mean degree of humidity, 82·12.

OWERRI.

Returns only made out from April to November. Rainfall, 92 inches. Maximum shade temperature, 91·57 in April. Minimum shade temperature, 71·25 in August.

FORCADOS.

Returns only made out from July to December. Rainfall, 87·81 inches. Mean degree of humidity, 86·44. Maximum shade temperature, 87·61, recorded in December. Minimum shade temperature, 72·48 in July.

ONITHSA PLANTATION.

The maximum shade temperature was 92·83 recorded in April, and the minimum shade temperature 72·16 in January. The highest mean monthly temperature was 81·61 in March, and the lowest, 75·73 in July. The mean temperature for the year was 78·73. The total rainfall, 60·07 inches. The mean degree of humidity, 79·01.

BENIN CITY.

No returns were furnished for March, April, and May. The maximum shade temperature was 88·71 recorded in February, and the minimum shade, 67·83 in December. The highest mean monthly tempera-

ture was 79·83 in June, and the lowest 74·71 in August. The mean recorded temperature for the year, 77·22. Recorded rainfall, 138·75 inches. Mean degree of humidity, 83·02.

AFIKPO.

The maximum shade temperature was 91·70 recorded in April, and the minimum shade temperature, 69·22 in December. The mean monthly temperature was 82·69 in March, and the lowest, 76·87 in September. The mean temperature for the year was 79·00. The total rainfall, 83·88 inches. The mean degree of humidity, 82·66.

CALABAR TOWN.

The sanitary condition is much improved. Roads and drains are being made throughout the town. Four latrines have been built, and are of great convenience to the natives. I think another four might with advantage be erected. The town is growing rapidly. I am of opinion that this growth is due to aliens from Lagos, Gold Coast, and Sierra Leone, rather than to the aborigines of the place.

The removal of the soldiers, with their wives and families, to the new barracks will be an important step towards European reservations. Owing to the large percentage of children that harbour the malarial parasites, they are undoubtedly a source of great danger to Europeans.

The sick returns throughout the Protectorate have heretofore not been made out in accordance with the "model return," so regret that, with the exception of Calabar, I am not in a position to furnish the model return for out-stations.

BONNY.

The health of both Europeans and natives was good. At present the medical officer has only one room in which to store his medicines, dispense and attend to patients. In the native hospital which is being built proper accommodation in the form of a consulting-room, dispensary and storeroom are provided. One of the stores at Tunnicliffe House has been fitted up as a prison. This store is well ventilated, and the floor has been raised, and as a lock-up is most suitable. Excluding the cases of beri-beri sent on from Calabar only four cases requiring to be isolated occurred in Bonny during last twelve months, two having been landed from a steamer. The health of the children at the Government school has been very good, and the water supply excellent.

European deaths, *nil*. Invalidings, *nil*.

EGWANGA.

The health during 1905 was good. The native hospital is a very good type of native hospital. At one end there is a consulting-room, dispensary and storeroom, and at the other end quarters are provided for the native dispenser. The natives are now beginning to appreciate the advantages of such a hospital. The medical officer has done what he can to improve the sanitary condition of Opobo town, but owing to its low-lying situation and swampy condition little can be done in this direction. Much good work

has been done by carrying out the vaccination scheme, and small-pox, which was once very prevalent, is but seldom met with. The native town of Egwanga, which was a hotbed of disease, and was in close proximity to the European residences, has been cleared away.

Deaths amongst Europeans, *nil*. Invalidings, 7.

DEGAMA.

All Europeans now live on the beach, and the hulk *George Shotton*, which was for a number of years used as a residence for European officials, has been done away with.

A native hospital, with consulting-room, store, and dispensary is being built. When completed this will be of great assistance to the medical officer, who up to now has had to put up with the most limited accommodation. The health of the prisoners has been fairly good. There was an outbreak of dysentery amongst them which caused several deaths. No cause for this outbreak could be found. The native town of Abonema still maintains its reputation of being one of the cleanest and best kept towns in the Protectorate. Vaccination is still largely carried on, with the result that a case of small-pox is but rarely met with.

Deaths amongst Europeans, *nil*. Invalidings, 8.

BRASS.

The health of this station has been good. Though £400 had been allowed in the Estimates, 1905-1906, for a native hospital, it has not yet been built, though I am given to understand that building operations will shortly commence. Up to September the only accommodation the medical officer had, to see his patients in and dispense from, was a room 6 feet by 12 feet. In September Mr. James, who was acting as Deputy High Commissioner, handed over to the medical officer a native house to be used as a hospital and dispensary until such time as the native hospital was built. The health of the residents, both European and native, was good.

Deaths amongst Europeans, *nil*. Invalidings, 2.

AKASSA.

The health amongst the Government officials, both European and native, was satisfactory. Two rooms are occupied by the medical officer in the Rest House, one of which he uses as a dispensary and the other as a storeroom. There is no accommodation for sick Europeans or natives. I think it would be advantageous if the dispensary and storeroom were placed on the ground floor, and two rooms were fitted up for sick Europeans. The drainage system between the Marine and Engineer's beach has been most successful, but I think some of the swamp in the immediate vicinity of Marine beach might, with advantage, be filled in.

There is a covered-in well between the Marine and Engineer's beach. I consider this type of well most suitable for out here.

Deaths amongst Europeans, 1. Invalidings, 9.

ONITSHA.

This station is rapidly developing, and the headquarters of central division, which were originally at Asaba, have been transferred there. Within a short

time Onitsha will have both a European and native hospital. Up to now the medical officer has been placed at a disadvantage in not having such hospitals. The drinking water is stored rain-water. I believe the Director of Public Works has under consideration a scheme for supplying water from a stream in the vicinity. I was able, in August, to station a second medical officer at Asaba and Onitsha. The exigencies of the services in January necessitated my leaving Asaba and Onitsha in charge of one medical officer. I hope to be able to send a second medical officer there shortly.

Deaths amongst Europeans, 3. Invalidings, 8.

SAPELE.

The health of the Europeans at this station was good. A result, I have but little doubt, due to the Board of Health that exists here. I would strongly recommend the formation of similar boards at other stations.

With respect to the other stations throughout the Protectorate, I am pleased to report that the various medical officers are most energetic in trying to improve the health of the residents and sanitation of districts.

A. H. HANLEY, C.M.G., F.R.C.S.I., &c.,
Acting Principal Medical Officer.

COMPARATIVE EUROPEAN VITAL STATISTICS FROM 1901 TO 1905.

Year	Number	Died	Invalided	Death-rate per mil.	Invaliding per mil.
Officials—					
1901	121	4	15	33	123.9
1902	125	3	31	24	248
1903	159	2	27	12.57	169.84
1904	157	7	18	44.58	114.64
1905	199	5	43	25.1	216
Non-officials—					
1901	276	13	32	47.1	115.9
1902	279	8	17	28.67	60.93
1903	301	10	27	33.22	89.70
1904	343	12	24	34.98	69.97
1905	334	7	45	20.9	134.7
Officials and Non-officials combined—					
1901	397	17	47	42.82	118.42
1902	404	11	48	27.22	118.81
1903	460	12	54	26.08	117.39
1904	500	19	42	38	84
1905	533	12	88	22.5	150

NOTE.—Three officials and three non-officials died in England in 1905, not included in above figures.

ADMISSIONS TO EUROPEAN HOSPITAL SINCE 1901.

Year	Admissions	Died	Invalided
1901	118	2	13
1902	126	5	20
1903	128	2	13
1904	113	3	4
1905	170	2	4

GENERAL DISEASES.				Admis- sions.	Deaths.	Total Cases Treated.					Admis- sions.	Deaths.	Total Cases Treated.			
Alcoholism	4	..	4	GENERAL DISEASES—continued.									
Anæmia	62	..	62	Other Tubercular Diseases .. .. .							..	..
Anthrax	Varicella .. .. .							..	..
Beri-beri	5	..	5	Whooping Cough .. .. .							..	..
Bilharziosis	Yaws .. .. .							..	..
Blackwater Fever	Yellow Fever .. .. .							..	..
Chicken-pox										
Cholera										
Choleraic Diarrhœa										
Congenital Malformation										
Debility	41	..	41										
Delirium Tremens										
Dengue										
Diabetes Mellitus										
Diabetes Insipidus										
Diphtheria										
Dysentery	17	..	17										
Enteric Fever	3	..	3										
Erysipelas										
Febricula										
Filariasis										
Gonorrhœa	22	..	23										
Gout	2	..	2										
Hydrophobia										
Influenza	1	..	1										
Kala-Azar										
Leprosy										
(a) Nodular										
(b) Anæsthetic										
(c) Mixed										
Malarial Fever—	458	2	458										
(a) Intermittent—	14	4	14										
Quotidian										
Tertian										
Quartan										
Irregular										
Type undiagnosed	11	..	11										
(b) Remittent										
(c) Pernicious										
(d) Malarial Cachexia										
Malta Fever										
Measles										
Mumps										
New Growths—	63	..	63										
Non-malignant										
Malignant										
Old Age										
Other Diseases	136	..	136										
Pellagra										
Plague										
Pyæmia										
Rachitis										
Rheumatic Fever										
Rheumatism	59	..	59										
Rheumatoid Arthritis										
Scarlet Fever										
Scurvy										
Septicæmia										
Sleeping Sickness										
Sloughing Phagedæna										
Small-pox										
Syphilis—	4	..	4										
(a) Primary										
(b) Secondary										
(c) Tertiary										
(d) Congenital										
Tetanus										
Trypanosoma Fever										
Tubercle—										
(a) Phthisis Pulmonalis										
(b) Tuberculosis of Glands										
(c) Lupus										
(d) Tabes Mesenterica										
(e) Tuberculous Disease of Bones										
							LOCAL DISEASES.									
							Diseases of the—									
							Cellular Tissue							40	..	40
							Circulatory System—							21	1	22
							(a) Valvular Disease of Heart
							(b) Other Diseases							4	..	4
							Digestive System—							355	..	356
							(a) Diarrhœa
							(b) Hill Diarrhœa
							(c) Hepatitis
							Congestion of Liver
							(d) Abscess of Liver
							(e) Tropical Liver
							(f) Jaundice, Catarrhal
							(g) Cirrhosis of Liver
							(h) Acute Yellow Atrophy
							(i) Sprue
							(j) Other Diseases
							Ear							24	..	25
							Eye							15	..	15
							Generative System—
							Male Organs
							Female Organs
							Lymphatic System							40	..	40
							Nervous System							43	..	43
							Nose							2	..	2
							Organs of Locomotion							2	..	2
							Respiratory System							95	..	96
							Skin—							179	..	179
							(a) Scabies
							(b) Ringworm
							(c) Tinea Imbricata
							(d) Favus
							(e) Eczema
							(f) Other Diseases
							Urinary System							41	..	41
							Injuries, (General, Local—							50	..	50
							(a) Siriasis (Heatstroke)
							(b) Sunstroke (Heat Prostration)
							(c) Other Injuries
							Parasites—							22	..	22
							Ascaris lumbricoides
							Oxyuris vermicularis
							Dochmius duodenalis, or Ankylos- toma duodenale
							Dracunculus medinensis (Guinea- worm)							1	..	1
							Tape-worm
							Poisons—
							Snake-bites
							Corrosive Acids
							Metallic Poisons
							Vegetable Alkaloids							1	..	1
							Nature Unknown
							Other Poisons
							Surgical Operations—
							Amputations, Major
							" Minor
							Other Operations
							Eye
							(a) Cataract
							(b) Iridectomy
							(c) Other Eye Operations

GENERAL DISEASES.					GENERAL DISEASES--continued.				
	Admis- sions.	Deaths.	Total Cases Treat- ed.		Admis- sions.	Deaths.	Total Cases Treated.		
Alcoholism	2	..	2	Other Tubercular Diseases .. .. .	..	..	..
Anæmia	1	..	1	Varicella	69	..	77		
Anthrax .. .. .	..	..	..	Whooping Cough .. .. .	..	..	..
Beri-beri	3	1	3	Yaws	9	..	9		
Bilharziosis .. .. .	..	..	..	Yellow Fever.. .. .	..	..	..
Blackwater Fever .. .. .	..	..	..			
Chicken-pox .. .. .	..	..	..			
Cholera .. .. .	..	..	..			
Choleraic Diarrhœa .. .. .	..	..	..			
Congenital Malformation .. .. .	..	..	..			
Debility	259	..	259						
Delirium Tremens .. .. .	..	..	..			
Dengue .. .. .	..	..	..			
Diabetes Mellitus .. .. .	..	..	..			
Diabetes Insiptidus .. .. .	..	..	..			
Diphtheria .. .. .	..	..	..			
Dysentery	40	6	40						
Enteric Fever .. .. .	..	..	..			
Erysipelas	1	1	1						
Febricula .. .. .	..	..	..			
Filariasis .. .. .	..	..	..			
Gonorrhœa	100	..	100						
Gout .. .. .	..	..	..			
Hydrophobia .. .. .	..	..	..			
Influenza	1	..	1						
Kala-Azar .. .. .	..	..	..			
Leprosy .. .. .	..	..	..			
(a) Nodular .. .. .	..	..	..			
(b) Anæsthetic	2	..	2						
(c) Mixed .. .. .	..	..	..			
Malarial Fever— .. .. .	..	..	..			
(a) Intermittent .. .. .	..	..	..			
Quotidian.. .. .	251	..	252						
Tertian .. .. .	..	..	..			
Quartan .. .. .	..	..	..			
Irregular .. .. .	..	..	..			
Type undiagnosed	79	1	79						
(b) Remittent	26	1	27						
(c) Pernicious .. .. .	..	..	..			
(d) Malarial Cachexia .. .. .	..	..	..			
Malta Fever .. .. .	..	..	..			
Measles	2	..	2						
Mumps .. .. .	..	..	..			
New Growths— .. .. .	..	..	..			
Non-malignant .. .. .	..	..	..			
Malignant .. .. .	..	..	..			
Old Age .. .. .	..	..	..			
Other Diseases	77	2	77						
Pellagra .. .. .	..	..	..			
Plague .. .. .	..	..	..			
Pyæmia	1	1	1						
Rachitis .. .. .	..	..	..			
Rheumatic Fever	1,178	..	1,184						
Rheumatism .. .. .	..	..	..			
Rheumatoid Arthritis .. .. .	..	..	..			
Scarlet Fever.. .. .	..	..	..			
Scurvy .. .. .	..	..	..			
Septicæmia .. .. .	..	..	..			
Sleeping Sickness .. .. .	..	..	..			
Sloughing Phagedæna .. .. .	..	..	..			
Small-pox .. .. .	..	..	..			
Syphilis .. .. .	..	..	..			
(a) Primary	30	..	30						
(b) Secondary	52	..	52						
(c) Tertiary .. .. .	..	..	..			
(d) Congenital .. .. .	..	..	..			
Tetanus .. .. .	..	..	..			
Trypanosoma Fever.. .. .	..	..	..			
Tubercle—	1	..	2						
(a) Phthisis Pulmonalis .. .. .	..	..	..			
(b) Tuberculosis of Glands .. .. .	..	..	..			
(c) Lupus .. .. .	..	..	..			
(d) Tabes Mesenterica.. .. .	..	..	..			
(e) Tuberculosis Disease of Bones .. .. .	..	..	..			

LOCAL DISEASES.				
	Admis- sions.	Deaths.	Total Cases Treated.	
Diseases of the—				
Cellular Tissue	980	1	992	
Circulatory System—	27	2	27	
(a) Valvular Disease of Heart .. .. .	..	..	..
(b) Other Diseases.. .. .	..	..	..
Digestive System—	1,729	10	1,729	
(a) Diarrhœa .. .. .	..	..	..
(b) Hill Diarrhœa.. .. .	..	..	..
(c) Hepatitis .. .. .	..	..	..
Congestion of the Liver .. .. .	..	..	..
(d) Abscess of Liver .. .. .	..	..	..
(e) Tropical Liver.. .. .	..	..	..
(f) Jaundice, Catarrhal .. .. .	..	..	..
(g) Cirrhosis of Liver .. .. .	..	..	..
(h) Acute Yellow Atrophy .. .. .	..	..	..
(i) Sprue .. .. .	..	..	..
(j) Other Diseases .. .. .	..	..	..
Ear	69	..	69	
Eye	173	..	173	
Generative System— .. .. .	..	..	..
Male Organs	72	..	76	
Female Organs	13	1	14	
Lymphatic System	38	..	38	
Nervous System	201	2	202	
Nose .. .. .	..	..	..
Organs of Locomotion.. .. .	192	..	192	
Respiratory System	694	4	695	
Skin—	356	..	357	
(a) Scabies .. .. .	..	..	..
(b) Ringworm .. .. .	..	..	..
(c) Tinea Imbricata .. .. .	..	..	..
(d) Favus .. .. .	..	..	..
(e) Eczema.. .. .	..	..	..
(f) Other Diseases .. .. .	..	..	..
Urinary System	25	..	27	
Injuries, General, Local—	1,007	3	1,033	
(a) Siriasis (Heatstroke) .. .. .	..	..	..
(b) Sunstroke (Heat Prostration) .. .. .	..	..	..
(c) Other Injuries .. .. .	..	..	..
Parasites—	218	..	284	
Ascaris lumbricoides .. .. .	..	..	..
Oxyuris vermicularis .. .. .	..	..	..
Dochmius duodenalis, or Ankylos- toma duodenale .. .. .	..	..	..
Dracunculus medinensis (Guinea- worm) .. .. .	..	..	..
Tape-worm .. .. .	..	..	..
Poisons— .. .. .	..	..	..
Snake-bites .. .. .	..	..	..
Corrosive Acids .. .. .	..	..	..
Metallic Poisons .. .. .	..	..	..
Vegetable Alkaloids .. .. .	..	..	..
Nature Unknown .. .. .	..	..	..
Other Poisons	1	..	1	
Surgical Operations— .. .. .	..	..	..
Amputations, Major	22	3	22	
" Minor	360	..	360	
Other Operations .. .. .	..	..	..
Eye .. .. .	..	..	..
(a) Cataract .. .. .	..	..	..
(b) Iridectomy .. .. .	..	..	..
(c) Other Eye Operations .. .. .	..	..	..

NUMBER OF NATIVES TREATED AT NINETEEN OUTSTATIONS
DURING 1905.

DISEASES.	Total Cases Treated.	Deaths.
Malarial Fever	1,175	1
Hæmoglobinuric Fever	1	—
Unclassified Fever	106	5
Enteric Fever	—	—
Variola	160	29
Varicella	21	1
Dysentery	425	58
Beri-beri	203	20
Erysipelas	—	—
Pyæmia	1	1
Yaws	91	—
Tetanus	1	—
Tubercle	20	2
Leprosy	15	1
Syphilis	106	—
Gonorrhœa	575	—
Rheumatism	1,878	1
Anæmia	52	—
Influenza	3	—
Gout	2	—
Meningitis	—	—
Epilepsy	3	—
Debility	42	11
Paralysis	2	—
Alcoholism	2	—
Diseases of Circulatory System	105	11
" Cellular Tissue	265	—
" Digestive System	3,869	53
" Ear	244	—
" Eye	407	—
" Genito-Urinary System	297	8
" Lymphatic System	308	1
" Nervous System	213	2
" Nose	9	—
" Organs of Locomotion	111	—
" Respiratory System	1,764	28
" Connective Tissue	18	—
" Skin	1,563	—
Injuries, General	10	1
" Local	3,113	12
Poisons	28	1
Parasitic Diseases	392	—
Guinea-worms	148	—
Ascaris Lumbricoides	5	—
Filarial Loa	3	—
Local Diseases	77	10
Measles	4	—
Other Diseases	360	3
Appendicitis	1	1
Insanity	2	1
Sleeping Sickness	1	1
Ulcers and Abscesses	2,378	6

APPENDIX A.

REPORT ON LEPER ASYLUM, ASABA.

The Leper Asylum is a collection of reed huts in which live, on an average, 29 lepers, 13 male and 16 female.

These people, on the whole, seem to lead a happy existence, they are well fed and cared for; they are not enclosed and are practically free to wander where they like.

The admissions during the year numbered seven; a considerable number of lepers demanded admission, which in most cases was refused, owing to lack of funds for their support. Three children were born in the asylum, all of whom died within a short period; four lepers died and three left of their own accord.

In these cases I did not try to prevent their departure whenever satisfied that they were able to support themselves, as, apart from the absence of means of compulsion, I consider the limited accommodation of the settlement could be turned to the best account by being reserved for refugees and prisoners.

The staff consists of one native overseer, who has discharged his duties exceptionally well, and who is extremely gentle to the patients. It appears that the staff is undermanned, and that it is impossible to prevent patients wandering through the markets when they feel inclined during the absence of the overseer.

It is intended that the asylum be removed to Onitsha side in the near future, and, therefore, I do not think it worth while to suggest improvements in the Asaba settlement.

I do not know whether it is the intention of the Government to enforce isolation in cases of leprosy, if so it will be necessary to provide accommodation for at least 1,000 lepers from this district alone, and a scheme which does not embrace all cases is useless. I suggest as the only way of carrying out isolation on a large scale that the villages be required to provide settlements for their lepers, each to be supervised by an overseer appointed by the Government, who, with the headmen, will be responsible that lepers do not wander into the compounds of the healthy; this plan could be tried without expense in one or two of the native court towns and extended if found workable; the settlement at Onitsha could then be reserved for criminals and refugees, of whom there will be a sufficient number to tax its accommodation.

E. MOORE,
District Medical Officer.

Colonial Medical Reports.—No. 25.—Northern Nigeria.**MEDICAL REPORT FOR THE YEAR 1905.****By Dr. S. W. THOMPSTONE.***Principal Medical Officer.*

THE average number of Europeans resident in the Protectorate during the year was 342, of whom 277 were officials and 65 non-officials—331 being males and 11 females.

The native population was estimated as being 9,000,000 approximately.

Ten Europeans died during the year, 7 of whom were officials and 3 non-officials.

The total crude European death-rate for the year, calculated on the average resident population, was 29·23 per 1,000. As in former years, there was a very marked difference in the mortality rate of officials and that of other members of the community, there having been 7 deaths among 277 officials and 3 amongst 65 non-officials, giving an official death-rate of 25·27 per 1,000 as against a non-official one of 46·15 per 1,000. The difference is, however, much less marked this year than last, when the rates were 29·62 and 96·15 respectively.

These death-rates are, as stated above, "crude" death-rates, and they are not corrected for age and sex distribution, and are therefore not comparable with that of communities consisting of persons of all ages and both sexes in the proportions met with in Europe.

There has been an increase in the average resident European population as compared with 1904 of 20, last year's population having been estimated at 322. The death-rate has decreased by 11·14 per 1,000, and the invaliding rate by 64·73 per 1,000, the latter rate being 143·27 for the year 1905, as against 208 per 1,000 for 1904.

As in former years, the rainy season has proved the most unhealthy for Europeans, the greatest amount of sickness having occurred during the months of July, August and September. The wettest month, August, was the worst month, and March showed the fewest admissions—the former month having the highest relative humidity and the latter being the driest in the year.

The general character of the diseases prevailing showed little or no change. The case mortality of hæmoglobinuric fever was slightly higher than in 1904, but much lower than in 1903. The figures for the three years being 37·3 per cent. in 1903, 16·1 per cent. in 1904, and 20 per cent. in 1905; the actual number of admissions from this disease being 20, and the number of deaths 4, as against 31 cases with 5 deaths last year.

During the first three months of the year a very severe epidemic of cerebro-spinal fever broke out in all the provinces of the Protectorate—Borgu, Kontagora, Sokoto, and Bornu being the only places that escaped. With the exception of an outbreak among the East African carriers at Cape Coast Castle during

the Ashanti Expedition of 1900, this is the first recorded epidemic of this disease in West Africa, though A. Plehn mentions it as being amongst the diseases met with in Kamorun.

From enquiries made among the older natives it would seem that epidemics of this disease occur periodically over the whole of Northern Nigeria, and have been usually even more severe. The tradition is that it came originally from the north-east, but not in the memory of living man. Fifty years ago an epidemic is said to have occurred at Egga on the Niger, and ten years ago Kano was decimated by a very severe outbreak.

It is impossible to estimate the actual number of deaths, but there were certainly over 100 in Bautchi, 250 in Ilorin, and 60 in Zungeru, during the month of February alone, and the natives say that here were 50 deaths a day in Zaria, and 100 a day in Kano during January. Dr. McGahey reported from the Yola district that some of the villages lost 5 per cent. of the population during the three months, that in Yola town itself there were 300 deaths from the disease, and that the case mortality was approximately 50 per cent.

All native accounts agree in its being essentially a dry season disease, which always disappears when the rain begins. January, February and March being the bad months, the dust-storms being probably the cause of its spread, by disseminating the dread nasal secretions containing the causal organisms far and wide. At the commencement of the epidemic the case mortality was appalling—many of those attacked practically falling dead at their work—later, however, its virulence became attenuated and many of the later cases recovered.

Only two Europeans were attacked, both of whom died—one in Kano and one between Zaria and Zungeru; this comparative immunity being almost certainly due to the principle which has been adopted when laying out new stations, of building the European quarters at a distance from the native towns.

Several epidemics of small-pox also occurred during the dry season, but none of any great magnitude. The town of Katagum and an adjacent village called Kudabir suffered somewhat severely, and in the town of Bautchi the Emir stated that there had been 100 deaths during January and February from small-pox. In the Bautchi district it would appear that the disease spread from Kassina, a hamlet south of Zoranda, and from there was carried to Bautchi, and thence spread into the surrounding districts. The village of Keffin Fulani, between Bautchi and Ningwe, was practically emptied owing to the ravages of the disease. With the exception of a soldier and a horse-boy, no cases occurred in the camp.

Colonial Medical Reports.—No. 25.—Northern Nigeria
(continued).

AN interesting fact reported by the medical officer at Bauchi is that the *cow fulani* almost invariably escape small-pox: they are said to practise a form of inoculation of cow-pox virus, having apparently discovered for themselves that the one disease renders them immune from the other. Amongst other natives inoculation with small-pox virus is common—the sufferer being paid a small sum to allow the procedure.

There was practically no difference in the relative mortality amongst the Europeans in the different seasons. There were, however, many more native deaths during the first three months of the year—the increased mortality being principally due to the epidemics of cerebro-spinal fever and small-pox which broke out during the period.

Zungeru.—The rainfall during the year was 41·31 inches, or 9·8 inches less than in 1904; the wettest month being September with 8·04 inches. Rain fell during eight months of the year—March to October inclusive—the heaviest fall recorded being 2·63 inches in the twenty-four hours, on October 15th.

The maximum shade temperature was 106° F., which was recorded on April 8th; the minimum, 56° F., on December 1st. The highest mean temperature for the month was 87° F. in March and April, and the lowest 77·3° F. in August; the mean temperature for the year being 80·1° F. The mean relative humidity for the year was 58, the highest mean being 81·6 for August, and the lowest 33 for January and February—calculated from readings taken at 9 a.m. The lowest actual relative humidity recorded was 16, from hygrometer readings taken at 4 p.m. on April 7th, and December 21st and 30th.

Lokoja.—The total rainfall was 49·64 inches for the year, or 7·92 inches more than last year—the heaviest rainfall occurred in September, 16·28 inches. The maximum shade temperature was 101° F., which was recorded on March 10th, and the minimum 53° F., on December 31st. The highest mean temperature for the month was 87° F. for March and April, and the lowest 78° F. for August and December—the mean temperature for the year being 81° F.

The mean relative humidity for the year was 72, the highest mean being 78·7 for September, and the lowest 60 for March.

The highest temperature recorded in Northern Nigeria during the year was 118° F. at Maifani on April 8th, and the lowest 39° F. at Kano on February 2nd: the highest mean temperature for the year being at Kontagora, 82° F., and the lowest, Zaria, 74° F. The greatest rainfall was at Zaria with 51·27 inches, and the lowest, Sokoto, with 33·32 inches. The maximum fall on one day being at Ilorin, on June 2nd, 4·04 inches.

The general direction of the wind throughout the Protectorate was from the south-west from June to November, and from the north-east during the remaining months of the year, the Harmattan lasting, with slight intermissions, from December to the end of May; the first tornado occurring in March, and the rainy season ending in October.

The meteorological conditions have considerable influence on the health of the community, the dry sea-

son being comparatively more favourable to Europeans, owing to the absence of mosquitoes and the more bracing condition of the atmosphere—the nights being cool, and the temperature, though high during the day, owing to the low relative humidity, being much more easily borne than the damp relaxing heat of the rains. The number of admissions from malaria rise rapidly after the first tornadoes, and reach their maximum when the rains are heaviest. The natives, on the contrary, suffer more during the dry season, not only from epidemics, but from respiratory and digestive diseases brought on by the cold nights and scarce and impure water supply.

The greatest amount of sickness during the year among Europeans has been due to malaria. The total number of admissions from this disease (excluding blackwater fever for the sake of convenience) having been 445 with no deaths, compared with 515 admissions with 3 deaths last year.

Twenty cases of hæmoglobinuric fever occurred, with 4 deaths, and 34 of dysentery with no deaths. There were 2 cases of small-pox in Europeans during the year. Among the natives treated there were 1,090 cases of malaria with 12 deaths, 451 cases of dysentery with 48 deaths, and 769 cases of rheumatism with 1 death. Complete lists of all diseases treated both among Europeans and natives are attached at the end of this report.

The general sanitary condition of the European stations is good—the great need being better quarters. The expense of transport of material is so great that in practically all the stations off the rivers officers have to live in mud or grass native-built houses, which harbour insect life and are anything but weatherproof.

The water supplies have been improved where possible, the small condensers supplied to outstations having proved a great success. They have in conjunction with other sanitary measures been the cause of a large reduction in the number of cases of dysentery met with, no death having occurred from this disease during the last two years.

Under the influence of European teaching the large native towns are beginning to show some signs of improvement, but it will be many years before much can be done in this direction.

Zungeru.—The average resident European population during the year was 66—61·6 officials and 4·4 non-officials. The sanitary condition of the cantonment is excellent, the drainage being effective and the water supply good. The series of dams which was constructed last year for the purpose of holding up the water in the Dago and providing for a continuous flow, has answered its purpose admirably, and has now stood the test of two dry seasons.

The drinking water supplied by the condenser is of good quality and sufficient for all requirements.

The general health of the population has been good. The number of admissions to hospital was 92 with 2 deaths, one of which was the case of a patient who was brought into hospital from Barajuko, and whose illness was contracted on the river. Last year there were 123 admissions with 4 deaths—a very marked reduction both in the number of admissions and the case mortality.

Gaol.—The sanitary condition is good, the cells

being kept clean, and the yard dry and well swept. The ventilation works out at about 350 cubic feet per inmate, and as the doors are grated and ample openings are provided in the walls the air in the buildings is always fresh. The water supply is obtained from the Kaduna and Dago Rivers, and is of good quality and ample in amount, no limit being laid down as to the quantity supplied. Combustible refuse is burnt, and excreta carried out in pans and buried in trenches.

The general health of the prisoners during the year has been fair, but many of the inmates were in wretched condition when admitted. The principal diseases which occurred were dysentery, diarrhoea, rheumatism, guinea-worm and pneumonia.

The average number of prisoners was 162; and the quality of the prison diet good.

Freed Slaves' Home.—Both the compound and the buildings are kept clean and in excellent sanitary condition. The average number of inmates during the year was 167, and their general health was good.

Ventilation is free and sufficient, and the water supply, which is obtained from the Kaduna and Dago, is good and ample. All drinking water is boiled before use. The refuse is disposed of by burning and burying in trenches—the pan system for excreta being in use.

The prevalent diseases were stomatitis, diarrhoea, intestinal parasites, and dysentery.

Lokoja.—The average resident European population was 73·8, 60 being officials and 13·8 non-officials. The sanitary condition of the cantonment is very good, great improvement having been effected during the past year. The drainage is satisfactory, and the European compounds and native lines well kept and clean. The drinking water from the condenser has been of excellent quality and sufficient in amount.

The general health of the community has been much better than in any previous year—the admissions to hospital having been only 101, as against 145 in 1904.

Gaol.—The sanitary condition of the gaol is extremely good, and the general health of the prisoners satisfactory. The water supply is obtained from a stream which runs near the prison, and from rain-water tanks on the premises. The supply is ample and the quality good. Ventilation is free and sufficient.

The average number of prisoners during the year was 67; and the prevalent diseases were diarrhoea and malaria.

Kano.—The average resident European population during the year was 21·8. The sanitary condition of the station is as good as circumstances will allow, but drainage is unsatisfactory, as owing to the nature of the ground no proper fall is obtainable at Nassarawa. A new site at Goza has been occupied by the military during the year with a view of testing its suitability for a permanent cantonment, and the results of the year's experience are being submitted separately.

The general health has been unsatisfactory, but so far as can be gathered from the statistics at present to hand, the new site presents distinct advantages over that now occupied by the civil population.

The water supply is derived from wells at Nassa-

rawa, which have proved insufficient for the needs of a large population during the dry season. At Goza it is obtained from pools fed by springs, and has so far proved sufficient.

There were 1,398 successful vaccinations performed during the year, all stations being now supplied with small consignments of lymph by each mail. The greatest difficulty is still experienced in obtaining it in an active condition at those stations which are farthest away from the sea-coast—the results for the year at Sokoto and Katagum being *nil*. In spite of this difficulty considerable progress has been made towards protecting the native troops and the inhabitants of the towns nearer headquarters.

Small-pox is endemic—a very considerable proportion of the adult population showing marks of previous attacks, and those who have not suffered from the disease are becoming keenly alive to the protection afforded by vaccination, being most anxious to have the operation performed whenever an outbreak occurs. To overcome the difficulty of obtaining active lymph the experiment of forming small vaccine stations at two or three stations intermediate in distance from the sea, such as Zaria, Kontagora, and Koffi, would be well worth trying. If these prove a success the system could then be extended with some hope of protecting the population in those portions of the Protectorate in which it has up to now proved impossible to obtain successful results.

Two cases of small-pox have occurred among the European officials, both of which, however, recovered.

The general health of the European community has been better than in any year on record. Both the death-rate and invaliding rate have been much lower than last year, the death-rate, which was 29·23 per 1,000, having been 20·33 per 1,000 less than the average of the previous five years, which works out at 49·56 per 1,000.

STATISTICS OF EUROPEAN POPULATION.

Europeans	1900	1901	1902	1903	1904	1905
Average actually in the Protectorate	165	165	290	309	322	342
Number of Deaths ..	13	9	9	18	13	10
Number of Invalids..	21	30	20	43	67	49

ANALYSIS OF 1905 STATISTICS.

Europeans	Total	Deaths	Death-rate per 1,000	Invalids	Invaliding Rate per 1,000
Average actually in the Protectorate	342	10	29·23	49	143·27
Officials ..	277	7	25·27	39	140·79
Non-officials ..	65	3	46·15	10	153·84

The invaliding rate was 143·27 per 1,000, the average for the last five years being 144·6.

The health of the native population was very bad during the earlier months of the year, owing to the epidemics of cerebro-spinal fever and small-pox above referred to. The total number of natives treated at

RETURN OF DISEASES AND DEATHS OF EUROPEANS IN 1905 THROUGHOUT THE

Protectorate of Northern Nigeria.

GENERAL DISEASES.

	Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism	1	—	1
Anemia	29	—	29
Anthrax	—	—	—
Beri-beri	—	—	—
Bilharziosis	—	—	—
Blackwater Fever	—	—	—
Chicken-pox	—	—	—
Cholera	—	—	—
Choleraic Diarrhoea	—	—	—
Congenital Malformation	—	—	—
Debility	45	—	45
Delirium Tremens	—	—	—
Dengue	—	—	—
Diabetes Mellitus	—	—	—
Diabetes Insipidus	—	—	—
Diphtheria	—	—	—
Dysentery	34	—	35
Enteric Fever	2	2	2
Erysipelas	—	—	—
Febricula	—	—	—
Filariasis	—	—	—
Gonorrhoea	—	—	—
Gout	—	—	—
Hydrophobia	—	—	—
Influenza	—	—	—
Kala-Azar	—	—	—
Leprosy	—	—	—
(a) Nodular	—	—	—
(b) Anæsthetic	—	—	—
(c) Mixed	—	—	—
Malarial Fever—	445	—	448
(a) Intermittent—	—	—	—
Quotidian	—	—	—
Tertian	—	—	—
Quartan	—	—	—
Irregular	—	—	—
Type undiagnosed	10	—	11
(b) Remittent	—	—	—
(c) Pernicious	20	4	23
(d) Malarial Cachexia	—	—	—
Malta Fever	—	—	—
Measles	—	—	—
Mumps	—	—	—
New Growths—	—	—	—
Non-malignant	—	—	—
Malignant	—	—	—
Old Age	—	—	—
Other Diseases	—	—	—
Pellagra	—	—	—
Plague	—	—	—
Pyæmia	—	—	—
Rachitis	—	—	—
Rheumatic Fever	—	—	—
Rheumatism	37	—	37
Rheumatoid Arthritis	—	—	—
Scarlet Fever	—	—	—
Scurvy	—	—	—
Septicæmia	—	—	—
Sleeping Sickness	—	—	—
Sloughing Phagedæna	—	—	—
Small-pox	2	—	3
Syphilis—	—	—	—
(a) Primary	—	—	—
(b) Secondary	—	—	—
(c) Tertiary	—	—	—
(d) Congenital	—	—	—
Tetanus	—	—	—
Trypanosoma Fever	—	—	—
Tubercle—	—	—	—
(a) Phthisis Pulmonalis	—	—	—
(b) Tuberculosis of Glands	—	—	—
(c) Lupus	—	—	—
(d) Tabes Mesenterica	—	—	—
(e) Tuberculous Disease of Bones	—	—	—

GENERAL DISEASES—continued.

	Admis- sions.	Deaths.	Total Cases Treated.
Other Tubercular Diseases	—	—	—
Varicella	—	—	—
Whooping Cough	—	—	—
Yaws	—	—	—
Yellow Fever	—	—	—

LOCAL DISEASES.

	Admis- sions.	Deaths.	Total Cases Treated.
Diseases of the—			
Cellular Tissue	12	—	12
Circulatory System—	—	—	—
(a) Valvular Disease of Heart	1	—	1
(b) Other Diseases	4	1	4
Digestive System—	109	—	109
(a) Diarrhoea	20	—	20
(b) Bill Diarrhoea	—	—	—
(c) Hepatitis	—	—	—
Congestion of Liver	—	—	—
(d) Abscess of Liver	6	—	6
(e) Tropical Liver	—	—	—
(f) Jaundice, Catarrhal	2	—	2
(g) Cirrhosis of Liver	—	—	—
(h) Acute Yellow Atrophy	—	—	—
(i) Sprue	—	—	—
(j) Other Diseases	16	—	16
Ear	4	—	4
Eye	14	—	15
Generative System—	13	—	14
Male Organs	—	—	—
Female Organs	—	—	—
Lymphatic System	15	—	15
Nervous System	10	—	10
Nose	1	—	1
Organs of Locomotion	3	—	3
Respiratory System	21	—	21
Skin—	—	—	—
(a) Scabies	—	—	—
(b) Ringworm	—	—	—
(c) Tinea Imbricata	—	—	—
(d) Favus	—	—	—
(e) Eczema	6	—	6
(f) Other Diseases	40	—	40
Urinary System	—	—	—
Injuries, General, Local	46	—	49
(a) Siriasis (Heatstroke)	—	—	—
(b) Sunstroke (Heat Prostration)	6	—	6
(c) Other Injuries	14	—	14
Parasites—	6	—	6
Ascaris lumbricoides	—	—	—
Oxyuris vermicularis	—	—	—
Doelminius duodenalis, or Aukylos- toma duodenale	—	—	—
Dracunculus medinensis (Guinea- worm)	—	—	—
Tapo-worm	—	—	—
Poisons—	—	—	—
Snake-bites	—	—	—
Corrosive Acids	—	—	—
Metallic Poisons	—	—	—
Vegetable Alkaloids	—	—	—
Nature Unknown	—	—	—
Other Poisons	4	—	4
Surgical Operations—	—	—	—
Amputations, Major	—	—	—
Minor	—	—	—
Other Operations	—	—	—
Eye	—	—	—
(a) Cataract	—	—	—
(b) Iridectomy	—	—	—
(c) Other Eye Operations	—	—	—

the government hospitals and dispensaries during the year was 16,557, an increase of 3,052 over last year. Of these, 1,090 were cases of malarial fever.

Dispensaries have been established during the year in most of the provinces, and although they have necessarily been equipped on a very small scale, 2,531 paupers have been treated throughout the Protectorate during the year.

The permanent enclosures to which I referred in my report last year, which were erected at Lokoja and Zungeru for isolating cases of infectious disease, have been invaluable, grass huts being run up inside them for the accommodation of patients, and burnt when

the epidemic subsides. In former years it was found to be practically impossible to prevent the friends of the patients visiting them at night and spreading the disease abroad. This has now been effectually stopped and effective isolation provided.

Veneral diseases are still very prevalent, there having been 1,063 cases of gonorrhœa and 370 of syphilis treated among natives during the year. The further away a station is from the sea the more cases of syphilis are met with, Bornu having the greatest number in Northern Nigeria; scarcity of water and consequent lack of personal cleanliness probably explaining the fact in part.

Colonial Medical Reports.—No. 26.—Saint Lucia.

ANNUAL REPORTS ON THE HOSPITALS AND DISPENSARIES, 1904.

CASTRIES.

*Alex. King, M.B., Ch.B., D.P.H., 2nd District
Medical Officer for Castries.*

In Castries better means of sewage collection and disposal should be adopted. The bucket system can hardly be dispensed with, but could easily be carried out on better lines, as it is capable of great improvement.

Bye-laws as to the disposal of domestic waste water should be enforced. The habit is to throw it on the ground in the most convenient place, thus producing a very foul state of the subsoil. This is especially objectionable as wells still exist, though apparently they are little used. The large prevalence of intestinal parasites is traceable to the same careless habit of throwing down filth around the houses.

There is a good deal of overcrowding both of persons in houses and of houses on the land. As things stand at present the space round each house is hopelessly deficient, resulting in the crowding together of outhouses which should be widely separate; for instance, privies are found next to and communicating with kitchens and servants' quarters, and cowhouses in the same relation to bakehouses.

It is an accepted fact that the death-rate varies directly with the density of the population, and though the Castries death-rate is wonderfully small it could be further reduced. At the same time this death-rate is not, I think, a very true index of the town's freedom from disease. In the present constitution of the population, owing to industrial con-

ditions, there is an excess of young adults, and a population so constituted has naturally a small death-rate.

Although the town has a good supply of gravitation water, tanks still abound. They are very well as a stand by, but should be built so as to be easily inspected; should be covered so as to prevent access of mosquitoes, and should be cleansed at regular intervals. Until these provisions are carried out tanks should be looked on with suspicion, if not actually as a nuisance.

The rivers round the town are in general use for washing clothes and are not suitable for the purpose. The flow of water is small at best, and now the beds are fouled with soapsuds, &c. The woman who washes furthest upstream may get clean water; those below certainly do not. Disease might easily be spread in this way.

Anse-la-Rayé village requires a better water supply. The plots round the houses are not well kept, and there are heaps of rubbish all through the village. The wash of the surf has piled up the sand till one of the beach privies has been left high and dry. The villagers continue to use it, so now there is a large collection of filth which is apparently never removed or even covered. The whole system of beach privies is objectionable, but when accidents of this kind happen it becomes injurious.

The ditch which runs parallel to the back of the village is stagnant, forming a splendid breeding-ground for mosquitoes. It also smells foul.

The village round Roseau Factory is dirty and badly kept.

Colonial Medical Reports.—No. 26.—Saint Lucia
(continued).

ANSE-LA-RAYE DISPENSARY.

THE diseases treated at Anse-la-Rayé Dispensary for the year 1904 were as follows:—

Intestinal Parasites	...	...	...	134
Malaria	...	...	...	57
Diseases of Digestive System	...	...	...	46
" Respiratory	...	...	...	24
" Nervous	...	...	...	7
" Circulatory	...	...	...	5
" Urinary	...	...	...	1
" Ear	...	...	...	2
" Eye	...	...	...	7
" Throat	...	...	...	3
" Nose	...	...	...	2
" Male Organs	...	...	...	1
" Female	...	...	...	12
" Blood	...	...	...	6
" Skin	...	...	...	8
Syphilis	...	...	...	11
Ulcers, Abscesses, &c.	...	...	...	13
Injuries	...	...	...	6
Tuberculosis	...	...	...	1
Hernia	...	...	...	2
Rachitis	...	...	...	1
Rheumatism	...	...	...	9
Arthritis	...	...	...	1
Spina bifida	...	...	...	1
Teeth Extracted	...	...	...	4
Indefinite	...	...	...	20
Total	...	...	...	384

GROS-ISLET DISPENSARY.

Alex. King.

The number of patients attending was 554. The following is an analysis:—

Diseases of Digestive System	...	...	...	75
" Respiratory	...	...	...	39
" Circulatory	...	...	...	29
" Urinary	...	...	...	1
" Nervous	...	...	...	11
" Lymphatic	...	...	...	4
" Eye	...	...	...	4
" Ear	...	...	...	10
" Throat	...	...	...	2
" Skin	...	...	...	19
" Male Organs	...	...	...	1
" Female	...	...	...	18
" Blood	...	...	...	1
Malignant New Growth	...	...	...	1
Rheumatism	...	...	...	11
Hernia	...	...	...	1
Tuberculosis	...	...	...	2
Malaria	...	...	...	121
Intestinal Parasites	...	...	...	88
Influenza	...	...	...	3
Ulcers, Abscesses, &c.	...	...	...	7
Injuries	...	...	...	3
Pregnant	...	...	...	4
Senility	...	...	...	3
Indefinite	...	...	...	21
Returns	...	...	...	75
Total	...	...	...	554

The most remarkable feature is the total absence from the list of syphilis and gonorrhœa. Next is the extremely low percentage (3 per cent.) of tuberculosis. Following on the absence of venereal disease the percentage of cases of disease of male organs is very small.

Malaria increased enormously in the last two months of the year. The others are fairly evenly distributed.

DENNERY.

Edwin Wells, M.B.(Edin.).

At the end of July, Dr. Payne resigned charge of this district and I took over from him on August 1st.

The number of persons who consulted me in both Micoud and Dennery Dispensaries during the year was 1,470. Malarial fevers, worms and digestive disturbances claim the lion's share of attention.

Malarial fevers are prevalent in the autumn, though cases are seen here and there all the year round.

In August and September an epidemic of whooping-cough invaded the district, but was quickly got under control and stamped out.

The estimated population for the year 1904 was 4,500. There were 91 deaths during the year, giving a death-rate of 20·2 per 1,000. One hundred and sixty-seven births took place in the district, the rate being 37·1 per 1,000.

SANITATION.

The sanitary condition has been fairly good all round. No diseases could be traced directly to insanitary conditions.

The sanitary condition of Micoud has been very good, and it is one of the cleanest villages in the island.

I append a list of the diseases treated at the Dennery and Micoud Dispensaries and the annual return for the hospital.

List of diseases treated at Dennery Dispensary during 1904:—

Alimentary System	...	...	...	96
Hæmopoietic	...	...	...	17
Respiratory	...	...	...	99
Genito-urinary	...	...	...	54
Special Senses	...	...	...	36
Malarial Fevers	...	...	...	190
Worms	...	...	...	202
Anæmia and Debility	...	...	...	29
Ulcers	...	...	...	16
Teeth Extraction	...	...	...	32
Suppuration and Abscess	...	...	...	6
Ankylostomiasis	...	...	...	6
Skin	...	...	...	31
Hysteria	...	...	...	8
Pregnant	...	...	...	3
Nervous	...	...	...	34
Senility	...	...	...	5
Rheumatism and Lumbago	...	...	...	15
Elephantiasis (Filaria)	...	...	...	1
Deformity	...	...	...	1
Bones and Joints	...	...	...	12
Hernia	...	...	...	1
Leprosy	...	...	...	1
Fracture	...	...	...	1
No Disease	...	...	...	28

Total ... 924

List of diseases treated at Micoud Dispensary during 1904 :—

Alimentary System ...	...	...	...	...	47
Hæmopoietic „ ...	...	...	...	...	4
Respiratory „ ...	...	...	...	...	61
Genito-urinary „ ...	...	...	...	...	11
Special Senses ...	...	...	...	...	19
Malarial Fevers ...	...	...	...	...	31
Worms ...	...	...	...	...	176
Anæmia and Debility ...	...	...	...	...	11
Ulcers ...	...	...	...	...	27
Teeth Extraction ...	...	...	...	...	14
Suppuration and Abscess ...	...	...	...	...	11
Ankylostomiasis ...	...	...	...	...	12
Skin ...	...	...	...	...	19
Pregnant ...	...	...	...	...	7
Nervous ...	...	...	...	...	5
Senility ...	...	...	...	...	12
Rheumatism and Lumbago ...	...	...	...	...	31
Elephantiasis ...	...	...	...	...	3
Deformities ...	...	...	...	...	5
Bones and Joints ...	...	...	...	...	17
Hernia ...	...	...	...	...	3
Bursitis ...	...	...	...	...	4
No Disease ...	...	...	...	...	15
Total ...	...	...	...	...	546

DENNERY HOSPITAL. RETURN OF ADMISSIONS, DISCHARGES, AND DEATHS DURING THE YEAR 1904.

	NATIVES			FOREIGNERS			COOLIES		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
Number in Hospital at last Return	1	2	3	1	1	3	3	7	221
Admitted during year ..	50	37	87	30	10	40	57	30	87
Total ..	51	39	90	31	10	41	60	30	90
Discharged cured ..	33	25	58	25	6	31	49	21	70
Discharged uncured ..	12	8	20	5	1	6	7	2	9
Deaths ..	1	2	3	1	2	3	2	7	9
Total ..	46	35	81	31	9	42	58	30	88
Remaining in Hospital at the close of the year	4	5	9	...	...	...	3	...	12

SOUFRIÈRE.

J. A. Lestrade, M.B., C.M., District Medical Officer, Soufrière.

The health of the Second District was good. Beyond ordinary ailments there were very few noticeable diseases of a severe type among the people. I attribute this to the better scavenging now going on for some time, but principally to the new water supply given to the town. One sees very few cases now of those continued fevers and bowel complaints which raged formerly in the town during the hottest part of the summer and autumn season; though there were

three mild epidemics of a contagious character during the year. Throughout the year, but principally about the time of the hot season, a skin disease, which was also prevalent the year before, was noticed. I believe this was caused by the irritation of minute particles of dust present in the atmosphere whenever the volcano of "Mont Pelée" at Martinique erupted, as it was first noticed after the first eruption in 1902.

About August, and for some time after, influenza was mildly prevalent, but it was practically of a harmless character.

At about the end of the year measles, with diarrhoea and bowel disturbances as an after symptom, began to show itself. It then spread in a southerly direction, and was still raging up to July last, when I gave over the district to Dr. Wells.

The institutions under my charge were well patronised. At the Soufrière Dispensary 1,224 people applied for treatment, of whom the greatest number were infants and children, brought for treatment for fevers caused by the irritation of teething and worms, and often also of bad innutritious food.

At the Choiseul Dispensary the number of patients treated was 198, with 175 successful vaccinations.

At the Poor Asylum the number treated was 137; 94 were admitted during the year. The number of indigent and sick paupers must be increasing at the present moment in Saint Lucia by leaps and bounds.

The number of yaws patients treated during the year was 80. The appellation of "yaws patients" is patently a misnomer, as three cases of leprosy were sent to me from Castries for admittance, making a total, with those already in the asylum, of 7 cases treated during the year.

There were 11 deaths at the institution during the year; of these, 7 were due to yaws, 2 to debility and exhaustion consequent on tertiary syphilis, and 2 to leprosy.

At the Lunatic Asylum there were, at the beginning of 1904-4 female inmates; 7 were admitted, making a total of 11 treated during the year. One was discharged and 2 died. The cases treated were mostly epileptics and those suffering from senile dementia.

At the Soufrière Hospital 85 patients were treated, and of those 63 were admitted during the year: 65 were discharged cured or relieved, and there were 18 deaths.

VIEUX-FORT.

A. B. Duprey.

The last census seems to have been taken in the year 1901, the populations of Vieux-Fort and Laborie being then estimated respectively at 3,500 and 3,278 souls. The number of people in Laborie district for 1902 was estimated at 3,324, there being a small increase of 46. The Vieux-Fort and Laborie districts are very sparsely populated and consist of principally a labouring class of people mostly engaged in agriculture.

The births and deaths during the year 1904 as compared to those of 1903 are hereby represented in tabulated form :—

1903.

Districts	Births	Deaths	Birth-rate per 1,000	Death-rate per 1,000
Vieux-Fort	128	53	36.5	15.1
Laborie	142	58	43.3	17.6

1904.

Districts	Births	Deaths	Birth-rate per 1,000	Death-rate per 1,000
Vieux-Fort	117	45	83.1	12.8
Laborie	125	65	38	19.8

There were no serious epidemics during the year; a few cases of influenza occurred in January and February, but these were mild in nature. At the latter part of the year, viz., in August, a few cases of whooping-cough were treated in the dispensaries, but these soon disappeared. Malarial fever was prevalent but usually of a mild intermittent character, chiefly at the end of the year.

There appeared to be more deaths during the latter part of the year, say, between the months of August and November, than at the commencement of the year. Sudden deaths among children occurred fairly frequently, mostly due to untreated malaria contracted in the heights of the districts, and to a great extent also from infection by the *Ascaris lumbricoides*.

Throughout the year there was a want of rain felt in both districts. At Laborie there were more frequent showers than at Vieux-Fort. The highest records occurred during the months of June and August, when the rainfalls were 6.68 and 5.21 inches respectively; the total number of inches for the whole year being 45.27 inches, or 15.21 inches less than the preceding year. The commencement of 1905 was likewise characterised by a drought, the records being 1.69 for January, 1.64 for February, and up to date, March 20th, 1.10 inches. Between January and the middle of March, 1905, there was a constant piercing east wind blowing almost to a half gale; its effect upon the health curve of Vieux-Fort district was distinctly depressing. Bronchial affections and acute tonsillitis were then very frequent.

MALARIAL FEVER.

There were a good many cases of fever treated as usual at both dispensaries, though far less in number than the preceding year. This may be owing to the drought which more or less characterised the greater part of the year, thus lessening the pools and drying up stagnant swamp water. Malaria is, however, latent in most people and only requires some slight depressing cause to bring out the whole phenomena of an attack of malarial fever. Of 1,031 persons seen at the Vieux-Fort Dispensary, 142, or 13.7 per cent., suffered from malaria, and in every case was benefited by quinine. There were two severe cases of fever treated in this hospital.

DYSENTERY.

This disease is present in sporadic form and in no particular season of the year. There were 14 cases during the year, scattered in different parts in both districts and these received special attention. I have no means of investigating microbic dysentery, but I would only like to suggest here a probable cause of dysentery, whether sporadic or epidemic. Dysentery, if I may be allowed to suggest, has a direct relation to the advance of agriculture in the West Indies. It is noticeably so in hilly countries, especially where large quantities of manure are being used for furthering the growth and keeping up the standard of West Indian products. The heavy rains are apt to wash down the rather loose manure into the streams and rivers, thereby constituting a source of danger to the population lower down who drink these waters. This disaster is to a great extent prevented in this district owing to the nature of the country, which is more or less level. Still, however, the danger exists, and the nature of the manure used, whether chemical or organic, makes little difference.

In the treatment of acute or chronic dysentery, I put great reliance on the use of sublimed sulphur, which in my hands invariably gives excellent results. The method of administering the drug has already been communicated in the JOURNAL OF TROPICAL MEDICINE in 1901. I have since found though, that the good results obtained do not depend upon the Dover's powder combined with it, but to the virtues of the sulphur alone.

ANKYLOSTOMIASIS.

This so-called anæmia is widely prevalent in both districts, though cases do not often come to hospital for treatment. In one instance, that of a black man and a labourer, the anæmia was intense and the number of worms passed were few, yet he, however, recovered sufficient strength and colour to be discharged in a week. This man said on admission he could hardly get the necessary food to keep him standing. He improved rapidly on a liberal diet, and one could not doubt that his case was primarily one of starvation.

LUNG DISEASE.

This cannot be said to be of very common occurrence. I have seen some cases of asthma, the treatment of which condition is very unsatisfactory, owing to the irregular attendance of these to the dispensaries:

VENEREAL.

Gonorrhœal affections are very common indeed and there are many who are crippled from gonorrhœal rheumatism. Ophthalmia and blindness from the same cause are frequent; I have seen 3 cases during the year of total blindness from this cause, one of whom died from pyæmia. Syphilis is exceedingly common and is on the increase. A goodly number are imported by labourers who have returned from Cayenne, but a great many get infected locally. The tertiary manifestations of syphilitic brain disease are sometimes seen; I saw two such cases last year.

ASCARIDES.

This affection is by far the most common in the districts. In fact, I do not remember any other place where the ascaris is more readily found. It is difficult to assume a cause for this extensive worm disease; sea-coast towns and villages are not more apt to be infested than inland towns and villages, but it is possible that the great quantity of pigs that are reared inside and around the towns may furnish a probable cause. Notter and Firth in, their "Theory and Practice of Hygiene," mention that pigs are infested by the same worm as are human beings and thus the disease is transmitted to man by contamination of "water from streams and ponds," or even the sands and loose earth where potatoes and other vegetables are grown. Not a few cases simulate acute meningitis.

RHEUMATISM.

I have already drawn attention to the frequency with which children and adults are affected with subacute rheumatism and heart disease. Considering how often it has been stated that acute or subacute rheumatism is not to be found in the Tropics, this should draw particular attention to the fact of its presence.

YAWS.

These were not many; only 5 cases attended the Vieux-Fort Dispensary; at Laborie also there were a few cases. It is a disease that affects the lowest classes and is to be found only in certain islands of the West Indies, and then only in certain localities. Yaws come from the heights of the districts.

The districts of Vieux-Fort and Laborie were fairly healthy during 1904. There is no special sanitary arrangement or water supply. The dry earth system prevails here.

The villages of Vieux-Fort and Laborie are full of small huts negligently built without any due regard to air space per head or to ventilation. A whole family are sometimes crowded in a small hut at night without even a window open to allow the admittance of fresh air, but on the contrary, all crevices are hermetically sealed either with cotton-wool or rags.

Table of diseases treated at Vieux-Fort Dispensary during the year 1904:—

Fever	...	...	...	...	...	192
Worms	...	...	...	...	...	162
Digestive	...	...	...	...	...	201
Respiratory	...	...	...	...	...	84
Circulatory	...	...	...	...	...	3
Ulcers	...	...	...	...	...	83
Wounds	...	...	...	...	...	20
Venereal	...	...	...	...	...	30
Rheumatic	...	...	...	...	...	41
Headache	...	...	...	...	...	13
Gynæcological	...	...	...	...	...	27
Kidney	...	...	...	...	...	14
Skin	...	...	...	...	...	44
Special Senses	...	...	...	...	...	24
Debility	...	...	...	...	...	24
Toothache	...	...	...	...	...	18
Throat	...	...	...	...	...	3
Bones and Joints	...	...	...	...	...	8
Nervous	...	...	...	...	...	13

Fractures	...	...	...	...	...	2
Abscess	...	...	...	...	...	2
Tumours	...	...	...	...	...	4
Strumous	...	...	...	...	...	5
Yaws	...	...	...	...	...	5
Ankylostomiasis	...	...	...	...	...	4
Pregnant	...	...	...	...	...	3
Hæmopoietic	...	...	...	...	...	6
Total	...	...	...	...	...	1,034

Table of diseases treated at the Laborie Dispensary during 1904:—

Fever	...	...	...	...	...	86
Worms	...	...	...	...	...	98
Digestive	...	...	...	...	...	94
Respiratory	...	...	...	...	...	26
Circulatory	...	...	...	...	...	6
Ulcers	...	...	...	...	...	15
Venereal	...	...	...	...	...	10
Rheumatic	...	...	...	...	...	24
Headache	...	...	...	...	...	19
Gynæcological	...	...	...	...	...	12
Kidney	...	...	...	...	...	8
Skin	...	...	...	...	...	25
Special Senses	...	...	...	...	...	14
Senility and Debility	...	...	...	...	...	26
Toothache	...	...	...	...	...	1
Throat	...	...	...	...	...	5
Bones and Joints	...	...	...	...	...	13
Nervous	...	...	...	...	...	15
Abscess	...	...	...	...	...	4
Yaws	...	...	...	...	...	3
Ankylostomiasis	...	...	...	...	...	1
Pregnant	...	...	...	...	...	1
Hæmopoietic	...	...	...	...	...	5
Hernia	...	...	...	...	...	2
Cellular Tissue	...	...	...	...	...	4
Cancer	...	...	...	...	...	1
Total	...	...	...	...	...	518

NUMERICAL RETURNS.

During the year 1904 there were 1,262 cases admitted into hospital; in the previous year there were 1,639. Only those who urgently required attendance could be admitted, and this led to the exclusion of a large class of "No appreciable disease."

There were 82 deaths in a total of 1,343 cases treated, giving a death-rate of 6.1 per cent. There were 123 operations performed, of which a classification is appended.

The most important diseases treated are syphilis, malaria and intestinal parasites. Pulmonary tubercle is responsible for 16 deaths.

As a working basis it may safely be assumed that every adult labourer in Saint Lucia has had, or is actually suffering from, venereal disease.

(a) Soft chancres are not to my knowledge very prevalent; and unless they take on a phagedænic type are not seen by a medical officer, but are treated by the druggists or other bush vendors.

(b) Gonorrhœa seldom comes under observation unless complicated.

During the year 1904, 20 cases of stricture were treated in the Victoria Hospital.

Colonial Medical Reports.—No. 26.—Saint Lucia
(continued).

It is exceedingly rare to come across a woman who has not some pathological condition of the generative organs, or in other words, one who has not been the victim of gonorrhœa, syphilis, or sexual psychopathy.

(c) Syphilis is very prevalent, and along with malaria and intestinal parasites constitutes the bulk of cases treated throughout the island.

In 1904 the total number of cases treated in the Victoria Hospital was 1,343; of these malaria accounted for 227, syphilis 321, intestinal parasites 156. This does not represent the true percentage, which is really much higher. Thus, on March 31st, of 68 patients in the hospital, indisputable evidence of syphilis was found in 33, and there were at least 10 others about whom no satisfactory conclusion could be formed.

In the study of West Indian syphilis it is of the greatest importance to realise the certainty and frequency of non-venereal syphilis; neither age nor moral standing is a barrier against contagion. The so-called varieties of "Yaws" are true manifestations of syphilis.

Among certain tribes in Africa early infection with syphilis is practised as a safeguard to the future

health of the child, and in the West Indies the same belief prevails with regard to "Yaws."

Of late years it has been noticed that venereal syphilis has been on the increase in the town of Castries. Unfortunately, there are no available statistics. The facility with which work was obtained in the garrison town, which was also a coaling station, attracted large numbers of immigrants, many of whom were wanton vagrants from the neighbouring islands. Among this lot infection became very rife. In 1904 among males there were 20 cases of infection requiring operative interference, even to the extent of amputation of the penis.

The disregard of the populace to all sanitary and precautionary measures against diseases makes it a difficult problem to stamp out or even attempt a reduction in the parasitic affections.

CASTRIES DISPENSARY.

During the year 1904, 7,102 cases were treated at the Castries dispensary, and 9,626 ulcers were dressed.

It appears needless to classify the ailments treated, as was done in former years under the various systems of the body. The type of cases treated presents no difference from the more correct classification afforded by the hospital returns. The prominent features in both are syphilis, malaria and intestinal parasites.

Colonial Medical Reports.—No. 27.—Basutoland.

MEDICAL REPORT FOR THE YEAR 1905.

By Dr. E. C. LONG.

Principal Medical Officer.

GENERAL HEALTH.

The year 1905 was not so healthy as 1904. There were no epidemics of any magnitude or severity, but an increased number of minor ailments.

Speaking broadly, I should say that the general health of the Basuto is tending to a progressively lower standard, and the physical development to-day is inferior to that of the past generation.

This last point is illustrated by the low standard of the recruits seeking admission to the Bechuanaland Police. Of the last 50 candidates examined, all young men between the ages of 22 and 35, 20 per cent. were rejected on account of defective physique or bodily ailments.

I have, for some years now, noticed a decline in the physique of those who have attended school for several years, and I attribute it in part to the overcrowding

and deficient ventilation in many of the school buildings.

The increase of tubercular disease in the country during recent years emphasises the danger of these defective buildings. There is a distinct danger that unless steps are taken to render school accommodation better, that the schools will become centres for the spread of tuberculosis.

The question of the cubic space and ventilation of school buildings in relation to the number of pupils is of great importance, more especially in those schools which receive boarders.

Something might be done by insisting on a limit to the number of pupils accommodated in any given building, making the Government grant contingent on this proviso being adopted, and insisting that plans of all school buildings should be first submitted to the Government architect.

RETURN OF DISEASES AND DEATHS IN 1905 AT THE

Basutoland Hospitals.

GENERAL DISEASES.				GENERAL DISEASES—continued.			
	Admis- sions.	Deaths.	Total Cases Treated.		Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism	—	—	—	Other Tubercular Diseases	—	—	29
Anæmia	1	—	346	Varicella	—	—	—
Anthrax	—	—	—	Whooping Cough	—	—	51
Beri-beri	—	—	—	Yaws	—	—	—
Bilharziosis	—	—	—	Yellow Fever	—	—	—
Blackwater Fever	—	—	—				
Chicken-pox	—	—	—				
Cholera	—	—	—				
Choleraic Diarrhœa	—	—	—				
Congenital Malformation	—	—	—				
Debility	3	—	498				
Delirium Tremens	—	—	—				
Dengue	—	—	—				
Diabetes Mellitus	2	1	4				
Diabetes Insipidus	1	—	1				
Diphtheria	—	—	—				
Dysentery	4	—	21				
Enteric Fever	13	3	17				
Erysipelas	8	—	8				
Febricula	4	—	275				
Filariasis	—	—	—				
Gonorrhœa	—	—	420				
Gout	1	—	16				
Hydrophobia	—	—	—				
Influenza	—	—	—				
Kala-Azar	—	—	—				
Leprosy	—	—	—				
(a) Nodular	5	—	5				
(b) Anæsthetic	2	—	2				
(c) Mixed	5	—	5				
Malarial Fever—	1	—	1				
(a) Intermittent—	—	—	—				
Quotidian	—	—	—				
Tertian	—	—	—				
Quartan	—	—	—				
Irregular	—	—	—				
Type undiagnosed	—	—	—				
(b) Remittent	—	—	—				
(c) Pernicious	—	—	—				
(d) Malarial Cachexia	—	—	—				
Malta Fever	—	—	—				
Measles	2	—	277				
Mumps	—	—	41				
New Growths—	—	—	—				
Non-malignant	65	1	200				
Malignant	7	3	9				
Old Age	—	—	—				
Other Diseases	2	—	2				
Pellagra	—	—	—				
Plague	—	—	—				
Pyæmia	2	—	2				
Rachitis	—	—	—				
Rheumatic Fever	—	—	—				
Rheumatism	11	1	954				
Rheumatoid Arthritis	—	—	—				
Scarlet Fever	—	—	—				
Scurvy	2	—	24				
Septicæmia	—	—	—				
Sleeping Sickness	—	—	—				
Sloughing Phagedæna	—	—	—				
Small-pox	—	—	—				
Syphilis—	—	—	—				
(a) Primary	6	—	6				
(b) Secondary	—	—	477				
(c) Tertiary	26	1	888				
(d) Congenital	1	—	336				
Tetanus	—	—	—				
Trypanosoma Fever	—	—	—				
Tubercle—	—	—	—				
(a) Phthisis Pulmonalis	9	1	76				
(b) Tuberculosis of Glands	19	—	108				
(c) Lupus	1	—	1				
(d) Tabes Mesenterica	2	1	3				
(e) Tuberculous Disease of Bones	12	—	12				

At the vacation course for teachers, held at Maseru, in January, 1906, a few lectures on elementary hygiene were included in the course, and the teachers showed great intelligence in appreciating the lessons inculcated in these lectures. A year or so ago a small pamphlet on elementary hygiene was written and translated into Sesuto, but it should be included in one of the compulsory school readers.

SMALL-POX.

There were only two small outbreaks of this disease during the year. They were promptly stamped out by isolation and vaccination.

Fifteen thousand three hundred and eighty-five vaccinations were performed during the year, and the general condition of the people in this respect is satisfactory.

ENTERIC FEVER.

Comparatively few cases have been recorded, and, as in other years, these were mostly imported cases.

TUBERCULOSIS.

This is still increasing, 199 cases being recorded as against 155 in 1904. Tubercular glands in young people between the ages of 18 and 30 is the most common form.

LEPROSY.

Only a few new cases have been noted.

SYPHILIS.

This disease shows no abatement. It is noteworthy that of some thousands of cases recorded during the year, in only six instances was the primary lesion observed.

The increased number of cases of congenital syphilis shows that a large number of people go untreated. The secondary manifestations are usually so mild that the people neglect them, and only come up for treatment for severe tertiary lesions.

SCURVY.

Very few cases came under notice, and those were all imported from the various labour centres.

RHEUMATISM.

All forms of rheumatism have been very prevalent. The acute cases are seldom seen, but judging by the large amount of valvular disease of the heart, they must be fairly common.

LYMPHATIC SYSTEM.

A case of lymph scrotum was admitted into the Maseru Hospital in December, 1905. The blood was carefully examined for filariæ, but with negative results. He is a well-nourished young man, aged about 22, and the swelling was first noticed eight years ago, and has been gradually increasing in size. The tunica vaginalis contained an ounce of colourless serum.

This case is interesting, taken in connection with one of elephantoid swelling of the foot reported some years ago, in which filariæ were thought to have been observed in the blood. Specimens of the blood of this patient were forwarded to Sir P. Manson, who was, however, unable to confirm the presence of filariæ.

I have quite recently heard of a supposed case of elephantiasis of the leg in a native in Letsie's ward. My informant, who had spent some years in Central Africa, states that it is exactly like the cases he was accustomed to see there. I am endeavouring to get this patient under observation, and if successful a report with specimens of the blood will be forwarded for examination.

URINARY SYSTEM.

An interesting fact has been elicited in connection with Bright's disease. It is that the patients are invariably chiefs or well-to-do natives who indulge largely in a meat diet. It is practically unknown amongst the common people.

MALE GENERATIVE SYSTEM.

A successful case of enucleation of the prostate was undertaken in the Maseru Hospital. The patient, aged 65, prior to the operation had two ounces of residual urine. Urine was passed by the normal channel fourteen days after the operation, and when the patient left the hospital there was no residual urine.

DISEASES OF THE EYE.

Forty-five cases of cataract were operated on during the year. They were all of the senile variety, except one congenital cataract. The results were uniformly good, only one eye being lost from suppuration.

Glaucoma is still frequently met with, but only three cases were benefited by treatment. The remaining cases all came up for treatment after the glaucoma had been absolute for some years.

METEOROLOGICAL RETURN FOR THE YEAR.

	TEMPERATURE				RAINFALL *
	Shade Maximum	Shade Minimum	Range	Mean	
January ..	101	50	51	75	4.54
February ..	90	53	37	71	9.20
March ..	89	45	44	67	4.26
April ..	80	40	40	60	.96
May ..	81	26	55	53	1.19
June ..	85	20	65	53	.21
July ..	72	22	50	48	
August ..	78	22	56	48	.21
September ..	88	25	63	57	2.02
October ..	92	31	61	64	.41
November ..	95	43	52	69	1.81
December ..	96	47	51	72	5.28

* Total rainfall 30.09 inches.

Colonial Medical Reports.—No. 28.—Grenada.

RETURN OF DISEASES AND DEATHS IN 1905 AT COLONY, YAWS, ST. ANDREWS, AND CARRIACON HOSPITALS.

GENERAL DISEASES.				Admis- sions.	Deaths.	Total Cases Treated.					Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism .. .. .	..	..	..	1	—	1	GENERAL DISEASES—continued.				..	..	..
Anæmia .. .. .	..	..	..	16	—	18	Other Tubercular Diseases				..	..	..
Anthrax .. .. .	..	..	..	—	—	—	Varicella .. .. .	..	..	..	—	—	—
Beri-beri .. .. .	..	..	..	—	—	—	Whooping Cough .. .. .	..	..	..	—	—	—
Bilharziosis .. .. .	..	..	..	—	—	—	Yaws .. .. .	..	..	..	—	—	—
Blackwater Fever .. .. .	..	..	..	—	—	—	Yellow Fever.. .. .	..	..	..	—	—	—
Chicken pox .. .. .	..	..	..	—	—	—					..	..	..
Cholera .. .. .	..	..	..	—	—	—					..	..	..
Choleraic Diarrhoea .. .. .	..	..	..	—	—	—					..	..	..
Congenital Malformation .. .. .	..	..	..	—	—	—					..	..	..
Debility .. .. .	..	..	..	5	—	6					..	..	..
Delirium Tremens .. .. .	..	..	..	—	—	—					..	..	..
Dengue .. .. .	..	..	..	—	—	—					..	..	..
Diabetes Mellitus .. .. .	..	..	..	1	—	1					..	..	..
Diabetes Ininsipidus .. .. .	..	..	..	—	—	—					..	..	..
Diphtheria .. .. .	..	..	..	—	—	—					..	..	..
Dysentery .. .. .	..	..	..	12	5	12					..	..	..
Enteric Fever .. .. .	..	..	..	—	—	—					..	..	..
Erysipelas .. .. .	..	..	..	—	—	—					..	..	..
Febricula .. .. .	..	..	..	—	—	—					..	..	..
Filaria .. .. .	..	..	..	—	—	—					..	..	..
Gonorrhoea .. .. .	..	..	..	14	—	14					..	..	..
Gout .. .. .	..	..	..	—	—	—					..	..	..
Hydrophobia .. .. .	..	..	..	—	—	—					..	..	..
Influenza .. .. .	..	..	..	—	—	—					..	..	..
Kala-Azar .. .. .	..	..	..	—	—	—					..	..	..
Leprosy .. .. .	..	..	..	—	—	—					..	..	..
(a) Nodular .. .. .	..	..	..	—	—	—					..	..	..
(b) Anæsthetic .. .. .	..	..	..	—	—	—					..	..	..
(c) Mixed .. .. .	..	..	..	—	—	—					..	..	..
Malarial Fever— .. .. .	..	..	..	103	—	109					..	..	..
(a) Intermittent .. .. .	..	..	..	—	—	—					..	..	..
Quotidian .. .. .	..	..	..	—	—	—					..	..	..
Tertian .. .. .	..	..	..	—	—	—					..	..	..
Quartan .. .. .	..	..	..	—	—	—					..	..	..
Irregular .. .. .	..	..	..	—	—	—					..	..	..
Type undiagnosed .. .. .	..	..	..	—	—	—					..	..	..
(b) Remittent .. .. .	..	..	..	7	—	7					..	..	..
(c) Pernicious .. .. .	..	..	..	1	—	1					..	..	..
(d) Malarial Cachexia .. .. .	..	..	..	—	—	—					..	..	..
Malta Fever .. .. .	..	..	..	—	—	—					..	..	..
Measles .. .. .	..	..	..	—	—	—					..	..	..
Mumps .. .. .	..	..	..	—	—	—					..	..	..
New Growths— .. .. .	..	..	..	—	—	—					..	..	..
Non-malignant .. .. .	..	..	..	18	—	18					..	..	..
Malignant .. .. .	..	..	..	10	2	10					..	..	..
Old Age .. .. .	..	..	..	—	—	—					..	..	..
Other Diseases .. .. .	..	..	..	—	—	—					..	..	..
Pellagra .. .. .	..	..	..	—	—	—					..	..	..
Plague .. .. .	..	..	..	—	—	—					..	..	..
Pyæmia .. .. .	..	..	..	1	1	1					..	..	..
Rachitis .. .. .	..	..	..	—	—	—					..	..	..
Rheumatic Fever .. .. .	..	..	..	3	—	3					..	..	..
Rheumatism .. .. .	..	..	..	22	—	24					..	..	..
Rheumatoid Arthritis .. .. .	..	..	..	—	—	—					..	..	..
Scarlet Fever .. .. .	..	..	..	—	—	—					..	..	..
Scurvy .. .. .	..	..	..	—	—	—					..	..	..
Septicæmia .. .. .	..	..	..	2	2	2					..	..	..
Sleeping Sickness .. .. .	..	..	..	—	—	—					..	..	..
Sloughing Phagedæna .. .. .	..	..	..	—	—	—					..	..	..
Small-pox .. .. .	..	..	..	—	—	—					..	..	..
Syphilis .. .. .	..	..	..	—	—	—					..	..	..
(a) Primary .. .. .	..	..	..	11	—	12					..	..	..
(b) Secondary .. .. .	..	..	..	25	—	27					..	..	..
(c) Tertiary .. .. .	..	..	..	43	5	45					..	..	..
(d) Congenital .. .. .	..	..	..	13	—	14					..	..	..
Tetanus .. .. .	..	..	..	1	1	1					..	..	..
Trypanosoma Fever.. .. .	..	..	..	—	—	—					..	..	..
Tubercle— .. .. .	..	..	..	—	—	—					..	..	..
(a) Phthisis Pulmonalis .. .. .	..	..	..	3	—	3					..	..	..
(b) Tuberculosis of Glands .. .. .	..	..	..	3	3	3					..	..	..
(c) Lupus .. .. .	..	..	..	—	—	—					..	..	..
(d) Tabes Mesenterica.. .. .	..	..	..	—	—	—					..	..	..
(e) Tuberculosis Disease of Bones .. .. .	..	..	..	1	—	1					..	..	..

LOCAL DISEASES.

Diseases of the—				Admis- sions.	Deaths.	Total Cases Treated.
Cellular Tissue .. .. .	..	..	..	36	—	40
Circulatory System— .. .. .	..	..	..	—	—	—
(a) Valvular Disease of Heart .. .. .	..	..	..	31	4	32
(b) Other Diseases .. .. .	..	..	..	9	2	9
Digestive System— .. .. .	..	..	..	—	—	—
(a) Diarrhoea .. .. .	..	..	..	1	—	1
(b) Bill Diarrhoea .. .. .	..	..	..	—	—	—
(c) Hepatitis .. .. .	..	..	..	5	1	5
Congestion of the Liver .. .. .	..	..	..	—	—	—
(d) Abscess of Liver .. .. .	..	..	..	3	2	3
(e) Tropical Liver .. .. .	..	..	..	—	—	—
(f) Jaundice, Catarrhal .. .. .	..	..	..	2	—	2
(g) Cirrhosis of Liver .. .. .	..	..	..	2	—	3
(h) Acute Yellow Atrophy .. .. .	..	..	..	—	—	—
(i) Sprue .. .. .	..	..	..	1	1	1
(j) Other Diseases .. .. .	..	..	..	64	10	74
Ear .. .. .	..	..	..	2	—	2
Eye .. .. .	..	..	..	26	—	34
Generative System— .. .. .	..	..	..	—	—	—
Male Organs .. .. .	..	..	..	28	—	28
Female Organs .. .. .	..	..	..	59	1	62
Lymphatic System .. .. .	..	..	..	13	—	15
Nervous System .. .. .	..	..	..	19	4	21
Nose .. .. .	..	..	..	3	—	3
Organs of Locomotion .. .. .	..	..	..	26	1	28
Respiratory System .. .. .	..	..	..	36	1	44
Skin— .. .. .	..	..	..	—	—	—
(a) Scabies .. .. .	..	..	..	8	—	8
(b) Ringworm .. .. .	..	..	..	—	—	—
(c) Tinea Imbricata .. .. .	..	..	..	—	—	—
(d) Favus .. .. .	..	..	..	—	—	—
(e) Eczema .. .. .	..	..	..	5	—	5
(f) Other Diseases .. .. .	..	..	..	156	—	176
Urinary System .. .. .	..	..	..	74	3	79
Injuries, General, Local— .. .. .	..	..	..	52	2	57
(a) Siriasis (Heatstroke) .. .. .	..	..	..	—	—	—
(b) Sunstroke (Heat Prostration) .. .. .	..	..	..	—	—	—
(c) Other Injuries .. .. .	..	..	..	—	—	—
Parasites— .. .. .	..	..	..	222	—	222
Ascaris lumbricoides .. .. .	..	..	..	283	—	283
Oxyuris vermicularis .. .. .	..	..	..	76	—	76
Dochmius duodenalis, or Ankylos- toma duodenale .. .. .	..	..	..	247	—	253
Dracunculus medinensis (Guinea- worm) .. .. .	..	..	..	—	—	—
Tape-worm .. .. .	..	..	..	—	—	—
Poisons— .. .. .	..	..	..	—	—	—
Snake-bites .. .. .	..	..	..	—	—	—
Corrosive Acids .. .. .	..	..	..	—	—	—
Metallic Poisons .. .. .	..	..	..	1	1	1
Vegetable Alkaloids .. .. .	..	..	..	—	—	—
Nature Unknown .. .. .	..	..	..	—	—	—
Other Poisons .. .. .	..	..	..	—	—	—
Surgical Operations— .. .. .	..	..	..	—	—	—
Amputations, Major .. .. .	..	..	..	—	—	—
" Minor .. .. .	..	..	..	—	—	—
Other Operations .. .. .	..	..	..	—	—	—
Eye .. .. .	..	..	..	—	—	—
(a) Cataract .. .. .	..	..	..	—	—	—
(b) Iridectomy .. .. .	..	..	..	—	—	—
(c) Other Eye Operations .. .. .	..	..	..	—	—	—

Colonial Medical Reports.—No. 28.—Grenada—(continued).**POPULATION FOR THE YEAR 1905.**

Number of births during the year 1905	...	2,863
" deaths	...	1,586
" inhabitants in 1905	...	69,530
Number of inhabitants in 1904	... 68,253	Increase of " " ... 1,277

METEOROLOGICAL RETURN FOR THE YEAR 1904.*

	TEMPERATURE						RAINFALL		WINDS		Remarks
	Solar Maximum	Solar Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	141·2	136·0	81·9	71·9	10·0	·698	2·92	71·4	E.	114	
February .. .	145·0	133·2	81·2	70·2	11·0	·667	2·11	69·2	E.	155	
March .. .	140·5	132·2	82·2	71·8	10·4	·737	4·70	77·6	E.	154	
April .. .	140·1	120·0	83·6	73·9	9·7	·756	2·95	74·6	N.E.	140	
May .. .	140·3	134·2	83·9	74·7	9·2	·741	4·61	73·4	E.	143	
June .. .	137·8	130·0	83·6	74·7	8·9	·774	6·64	78·6	E.	135	
July .. .	137·4	120·0	83·7	74·9	8·8	·793	10·28	80·3	E.	112	
August .. .	138·2	125·0	84·5	75·0	9·5	·787	11·64	78·1	E.	98	
September .. .	142·5	128·0	84·8	75·0	9·8	·799	5·42	76·2	E.	91	
October .. .	144·8	127·0	84·9	75·3	9·6	·805	8·73	76·8	E.	89	
November .. .	142·5	118·0	83·7	74·9	8·8	1·033	12·23	95·0	E.	58	
December .. .	140·7	120·0	82·0	72·9	9·1	·775	5·66	78·3	E.	97	
Averages .. .	140·9	126·9	83·3	73·7	9·6	·780	77·89	77·4	E.	115	

* At Richmond Hill Meteorological Station in the south of the island.

Colonial Medical Reports.—No. 29.—Cyprus.**MEDICAL REPORT FOR THE YEAR 1905.****By the CHIEF MEDICAL OFFICER.****PUBLIC HEALTH.**

THE health of the island during the past year has, on the whole, been satisfactory, as, with the exception of an outbreak of measles, generally speaking of a mild type, which prevailed at the early part of the year almost throughout the whole of the island, and sporadic cases of typhoid fever, with conspicuously rare cases of diphtheria, no other infectious or contagious zymotic disease occurred during the year under report.

Malarial fevers, however, owing to the frequent late rains, were prevalent, particularly in the western

portion of the island, where also the rains were more abundant. Unfortunately, the rural population, as a whole, place little importance on this disease, which is considered as a natural course of things, and not the slightest prophylactic precautions are taken to avoid it.

The opinions expressed by the different medical officers on the subject of the general health have been satisfactory, and I submit reports from the districts of Nicosia and Larnaca.

HOSPITALS AND OUT-DOOR DISPENSARIES.

In the six hospitals, 1,945 patients were treated, 118 deaths occurred, and 261 surgical operations were

RETURN OF DISEASES AND DEATHS FOR 1905 IN EIGHT RURAL DIVISIONS OF

Cyprus.

GENERAL DISEASES.				Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism .. .. .	..	..	..	..	..	2
Anæmia .. .. .	..	..	..	..	..	192
Anthrax .. .. .	..	..	..	..	..	—
Beri-beri .. .. .	..	..	..	..	..	—
Bilharziosis .. .. .	..	..	..	..	..	—
Blackwater Fever .. .. .	..	..	..	..	..	—
Chicken-pox .. .. .	..	..	..	..	..	22
Cholera .. .. .	..	..	..	..	..	—
Choleraic Diarrhœa .. .. .	..	..	..	..	..	—
Congenital Malformation .. .. .	..	..	..	..	..	—
Debility .. .. .	..	..	..	..	..	432
Delirium Tremens .. .. .	..	..	..	..	..	—
Dengue .. .. .	..	..	..	..	..	—
Diabetes Mellitus .. .. .	..	..	..	..	..	8
Diabetes Insipidus .. .. .	..	..	..	..	..	—
Diphtheria .. .. .	..	..	..	..	..	—
Dysentery .. .. .	..	..	..	..	..	94
Enteric Fever .. .. .	..	..	..	..	..	37
Erysipelas .. .. .	..	..	..	..	..	32
Febricula .. .. .	..	..	..	..	..	136
Filariasis .. .. .	..	..	..	..	..	—
Gonorrhœa .. .. .	..	..	..	..	..	103
Gout .. .. .	..	..	..	..	..	6
Hydrophobia .. .. .	..	..	..	..	..	—
Influenza .. .. .	..	..	..	..	..	381
Kala-Azar .. .. .	..	..	..	..	..	—
Leprosy .. .. .	..	..	..	..	..	—
(a) Nodular .. .. .	..	..	..	..	..	—
(b) Anæsthetic .. .. .	..	..	..	..	..	6
(c) Mixed .. .. .	..	..	..	..	..	3
Malarial Fever— .. .. .	..	..	..	..	..	—
(a) Intermittent— .. .. .	..	..	..	..	..	—
Quotidian .. .. .	..	..	..	..	..	515
Tertian .. .. .	..	..	..	..	..	272
Quartan .. .. .	..	..	..	..	..	102
Irregular .. .. .	..	..	..	..	..	151
Type undiagnosed .. .. .	..	..	..	..	..	789
(b) Remittent .. .. .	..	..	..	..	..	108
(c) Pernicious .. .. .	..	..	..	..	..	8
(d) Malarial Cachexia .. .. .	..	..	..	..	..	—
Malta Fever .. .. .	..	..	..	..	..	—
Measles .. .. .	..	..	..	..	..	221
Mumps .. .. .	..	..	..	..	..	—
New Growths— .. .. .	..	..	..	..	..	—
Non malignant .. .. .	..	..	..	..	..	21
Malignant .. .. .	..	..	..	..	..	4
Old Age .. .. .	..	..	..	..	..	—
Other Diseases .. .. .	..	..	..	..	..	15
Pellagra .. .. .	..	..	..	..	..	—
Plague .. .. .	..	..	..	..	..	—
Pyæmia .. .. .	..	..	..	..	..	5
Rachitis .. .. .	..	..	..	..	..	—
Rheumatic Fever .. .. .	..	..	..	..	..	31
Rheumatism .. .. .	..	..	..	..	..	132
Rheumatoid Arthritis .. .. .	..	..	..	..	..	—
Scarlet Fever .. .. .	..	..	..	..	..	—
Scurvy .. .. .	..	..	..	..	..	—
Septicæmia .. .. .	..	..	..	..	..	3
Sleeping Sickness .. .. .	..	..	..	..	..	—
Sloughing Phagedæna .. .. .	..	..	..	..	..	—
Small-pox .. .. .	..	..	..	..	..	—
Syphilis— .. .. .	..	..	..	..	..	—
(a) Primary .. .. .	..	..	..	..	..	13
(b) Secondary .. .. .	..	..	..	..	..	43
(c) Tertiary .. .. .	..	..	..	..	..	—
(d) Congenital .. .. .	..	..	..	..	..	4
Tetanus .. .. .	..	..	..	..	..	—
Trypanosoma Fever .. .. .	..	..	..	..	..	—
Tubercle— .. .. .	..	..	..	..	..	57
(a) Phthisis Pulmonalis .. .. .	..	..	..	..	..	—
(b) Tuberculosis of Glands .. .. .	..	..	..	..	..	—
(c) Lupus .. .. .	..	..	..	..	..	—
(d) Tabes Mesenterica .. .. .	..	..	..	..	..	—
(e) Tuberculous Disease of Bones .. .. .	..	..	..	..	..	—
GENERAL DISEASES—continued.						
Other Tubercular Diseases				Admis- sions.	Deaths.	Total Cases Treated
Varicella .. .. .	..	..	..	..	..	—
Whooping Cough .. .. .	..	..	..	..	..	—
Yaws .. .. .	..	..	..	..	..	—
Yellow Fever .. .. .	..	..	..	..	..	—
LOCAL DISEASES.						
Diseases of the—						
Cellular Tissue .. .. .	..	..	..	..	..	124
Circulatory System— .. .. .	..	..	..	..	..	86
(a) Valvular Disease of Heart .. .. .	..	..	..	..	..	—
(b) Other Diseases .. .. .	..	..	..	..	..	—
Digestive System— .. .. .	..	..	..	..	..	950
(a) Diarrhœa .. .. .	..	..	..	..	..	—
(b) Hill Diarrhœa .. .. .	..	..	..	..	..	—
(c) Hepatitis .. .. .	..	..	..	..	..	—
Congestion of Liver .. .. .	..	..	..	..	..	—
(d) Abscess of Liver .. .. .	..	..	..	..	..	—
(e) Tropical Liver .. .. .	..	..	..	..	..	—
(f) Jaundice, Catarrhal .. .. .	..	..	..	..	..	—
(g) Cirrhosis of Liver .. .. .	..	..	..	..	..	—
(h) Acute Yellow Atrophy .. .. .	..	..	..	..	..	—
(i) Sprue .. .. .	..	..	..	..	..	—
(j) Other Diseases .. .. .	..	..	..	..	..	—
Ear .. .. .	..	..	..	..	..	74
Eye .. .. .	..	..	..	..	..	620
Generative System— .. .. .	..	..	..	..	..	—
Male Organs .. .. .	..	..	..	..	..	32
Female Organs .. .. .	..	..	..	..	..	64
Lymphatic System .. .. .	..	..	..	..	..	77
Nervous System .. .. .	..	..	..	..	..	511
Nose .. .. .	..	..	..	..	..	45
Organs of Locomotion .. .. .	..	..	..	..	..	47
Respiratory System .. .. .	..	..	..	..	..	659
Skin— .. .. .	..	..	..	..	..	743
(a) Scabies .. .. .	..	..	..	..	..	—
(b) Ringworm .. .. .	..	..	..	..	..	—
(c) Tinea Imbricata .. .. .	..	..	..	..	..	—
(d) Favus .. .. .	..	..	..	..	..	—
(e) Eczema .. .. .	..	..	..	..	..	—
(f) Other Diseases .. .. .	..	..	..	..	..	—
Urinary System .. .. .	..	..	..	..	..	56
Injuries, General, Local— .. .. .	..	..	..	..	..	498
(a) Siriasis (Heatstroke) .. .. .	..	..	..	..	..	—
(b) Sunstroke (Heat Prostration) .. .. .	..	..	..	..	..	—
(c) Other Injuries .. .. .	..	..	..	..	..	—
Parasites— .. .. .	..	..	..	..	..	58
Ascaris lumbricoides .. .. .	..	..	..	..	..	—
Oxyuris vermicularis .. .. .	..	..	..	..	..	—
Dochmius duodenalis, or Ankylos- toma duodenale .. .. .	..	..	..	..	..	—
Dracunculus medinensis (Guinea- worm) .. .. .	..	..	..	..	..	—
Tape-worm .. .. .	..	..	..	..	..	—
Poisons— .. .. .	..	..	..	..	..	—
Snake-bites .. .. .	..	..	..	..	..	—
Corrosive Acids .. .. .	..	..	..	..	..	—
Metallic Poisons .. .. .	..	..	..	..	..	—
Vegetable Alkaloids .. .. .	..	..	..	..	..	—
Nature Unknown .. .. .	..	..	..	..	..	—
Other Poisons .. .. .	..	..	..	..	..	1
Surgical Operations— .. .. .	..	..	..	..	..	—
Amputations, Major .. .. .	..	..	..	..	..	98
" Minor .. .. .	..	..	..	..	..	—
Other Operations .. .. .	..	..	..	..	..	—
Eye .. .. .	..	..	..	..	..	—
(a) Cataract .. .. .	..	..	..	..	..	—
(b) Iridectomy .. .. .	..	..	..	..	..	—
(c) Other Eye Operations .. .. .	..	..	..	..	..	—

performed. In the six district dispensaries 22,919 patients attended, whilst in the eight rural divisions 8,686 patients were visited by the rural medical officers during the year, the whole of these received medicines gratis.

LEPER FARM.

The number of inmates in the farm on December 31st, 1904, was 109; there were 13 admissions during the year, 9 deaths occurred, whilst 112 remained on December 31st, 1905.

The general health was very satisfactory, as also that of the children of lepers who have been now for some time removed from the Leper Farm to a separate house in the town; they continue to be very healthy, without as yet showing the slightest sign of leprosy, and their elementary education is looked after by one of the attendants, who also acts as governess.

LUNATIC WARDS.

There were 19 admissions during the year to this institution, and 15 were discharged relieved or cured; 1 death occurred and 42 remained in the wards on December 31st, 1905.

The health of all the inmates was good, notwithstanding that many cases are brought in in a very debilitated condition, and the wards had more inmates than the accommodation should hygienically permit.

QUARANTINE.

Owing to the continuation of plague in Egypt, all arrivals thence were subjected to medical inspection and the disinfection of susceptible articles.

Three cases of small-pox were detected and promptly dealt with at the quarantine ports; the disease did not enter the island.

VACCINATION.

During the year 7,837 vaccinations were performed, of these, 7,420 were primary operations, whilst 417 were revaccinations.

Of these operations 6,739 were reported as being successful, 607 as unsuccessful, whilst 491 were not seen by the vaccinators a second time.

ANIMAL DISEASE.

The veterinary surgeon's report, which I submit, deals fully with this subject.

CHEMICAL LABORATORY.

This branch of the department continues its most useful work with ever increasing satisfactory results.

NICOSIA.

Report by Dr. Robert A. Cleveland, District Medical Officer.

The general health of this district for this year has been fairly satisfactory. In the earlier months of the year there was an epidemic of measles which, I believe, was general throughout the island. No patients with this disease were admitted to hospital, and only 8 cases attended the out-patient department. There were many cases seen by me in private practice.

METEOROLOGICAL RETURN FOR THE YEAR 1905.

				TEMPERATURE						RAINFALL		WINDS		Remarks
				Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January	55.9	36.8	19.1	46.4	1.62	81.4	{ Nly. Ely. Wly. }	1.5	
February	58.1	36.0	22.1	47.1	2.18	80.8	{ Wly. Ely. Nly. }	1.0	
March	63.9	41.7	22.2	52.8	1.49	80.5	{ Nly. Ely. Wly. }	1.7	
April	74.0	47.2	26.8	60.6	1.94	70.8	{ Ely. Wly. Nly. }	1.7	
May	86.1	55.6	30.5	70.9	0.50	58.0	Wly.	1.7	
June	88.9	60.8	28.1	74.9	0.00	60.1	Wly.	2.2	
July	97.4	67.4	30.0	82.4	0.00	54.6	Wly.	1.7	
August	98.9	67.5	31.4	83.2	0.00	57.4	Wly.	1.5	
September	93.2	63.1	30.1	78.2	0.18	59.2	Wly.	1.3	
October	83.8	58.1	25.7	71.0	1.27	67.0	Wly.	1.2	
November	76.7	51.5	25.2	64.1	2.82	80.3	{ Sly. Wly. Nly. }	0.9	
December	59.1	41.4	17.7	50.3	2.57	77.3	{ Wly. Sly. Nly. }	1.1	
Year	78.0	52.3	25.7	65.2	14.57	69.0	Wly.	1.5	

RETURN OF DISEASES AND DEATHS IN 1905 AT THE SIX DISTRICT DISPENSARIES,

Cyprus.

GENERAL DISEASES.				GENERAL DISEASES - continued.			
	Admis- sions.	Deaths.	Total Cases Treated.		Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism	—	—	—	Other Tubercular Diseases	—	—	—
Anæmia	—	—	241	Varicella	—	—	—
Anthrax	—	—	—	Whooping Cough	—	—	—
Beri-beri	—	—	—	Yaws	—	—	—
Bilharziosis	—	—	—	Yellow Fever.. .. .	—	—	—
Blackwater Fever	—	—	—				
Chicken pox	—	—	2				
Cholera	—	—	—				
Choleraic Diarrhœa	—	—	—				
Congenital Malformation	—	—	—				
Debility	—	—	649				
Delirium Tremens	—	—	—				
Dengue	—	—	—				
Diabetes Mellitus	—	—	—				
Diabetes Insipidus	—	—	—				
Diphtheria	—	—	5				
Dysentery	—	—	363				
Enteric Fever	—	—	25				
Erysipelas	—	—	25				
Febricula	—	—	—				
Filariasis	—	—	—				
Gonorrhœa	—	—	152				
Gout	—	—	—				
Hydrophobia	—	—	—				
Influenza	—	—	1,416				
Kala-Azar	—	—	—				
Leprosy	—	—	—				
(a) Nodular	—	—	—				
(b) Anæsthetic	—	—	—				
(c) Mixed	—	—	—				
Malarial Fever	—	—	—				
(a) Intermittent	—	—	—				
Quotidian	—	—	1,874				
Tertian	—	—	1,004				
Quartan	—	—	100				
Irregular	—	—	120				
Type undiagnosed	—	—	1,033				
(b) Remittent	—	—	684				
(c) Pernicious	—	—	21				
(d) Malarial Cachexia	—	—	—				
Malta Fever	—	—	—				
Measles	—	—	48				
Mumps	—	—	9				
New Growths—	—	—	—				
Non-malignant	—	—	49				
Malignant	—	—	34				
Old Age	—	—	—				
Other Diseases	—	—	11				
Pellagra	—	—	—				
Plague	—	—	—				
Pyæmia	—	—	—				
Rachitis	—	—	—				
Rheumatic Fever	—	—	37				
Rheumatism	—	—	640				
Rheumatoid Arthritis	—	—	—				
Scarlet Fever	—	—	—				
Scurvy	—	—	14				
Septicæmia	—	—	1				
Sleeping Sickness	—	—	—				
Sloughing Phagedæna	—	—	—				
Small-pox	—	—	—				
Syphilis	—	—	—				
(a) Primary	—	—	125				
(b) Secondary	—	—	133				
(c) Tertiary	—	—	—				
(d) Congenital	—	—	45				
Tetanus	—	—	2				
Trypanosoma Fever	—	—	—				
Tubercle—	—	—	140				
(a) Phthisis Pulmonalis	—	—	—				
(b) Tuberculosis of Glands	—	—	—				
(c) Lupus	—	—	—				
(d) Tabes Mesenterica	—	—	—				
(e) Tuberculous Disease of Bones	—	—	—				

LOCAL DISEASES.

Diseases of the—			
Cellular Tissue	—	—	612
Circulatory System—	—	—	343
(a) Valvular Disease of Heart	—	—	—
(b) Other Diseases	—	—	—
Digestive System—	—	—	3,234
(a) Diarrhœa	—	—	—
(b) Bill Diarrhœa	—	—	—
(c) Hepatitis	—	—	—
Congestion of the Liver	—	—	—
(d) Abscess of Liver	—	—	—
(e) Tropical Liver	—	—	—
(f) Jaundice, Catarrhal	—	—	—
(g) Cirrhosis of Liver	—	—	—
(h) Acute Yellow Atrophy	—	—	—
(i) Sprue	—	—	—
(j) Other Diseases	—	—	—
Ear	—	—	496
Eye	—	—	2,213
Generative System—	—	—	—
Male Organs	—	—	142
Female Organs	—	—	256
Lymphatic System	—	—	286
Nervous System	—	—	531
Nose	—	—	131
Organs of Locomotion	—	—	147
Respiratory System	—	—	1,415
Skin—	—	—	1,684
(a) Scabies	—	—	—
(b) Ringworm	—	—	—
(c) Tinea Imbricata	—	—	—
(d) Favus	—	—	—
(e) Eczema	—	—	—
(f) Other Diseases	—	—	—
Urinary System	—	—	193
Injuries, General, Local—	—	—	575
(a) Siriasis (Heatstroke)	—	—	—
(b) Sunstroke (Heat Prostration)	—	—	—
(c) Other Injuries	—	—	—
Parasites—	—	—	160
Ascaris lumbricoides	—	—	—
Oxyuris vermicularis	—	—	—
Dochmius duodenalis, or Ankylos- toma duodenale	—	—	—
Dracunculus medinensis (Guinea- worm)	—	—	—
Tape-worm	—	—	—
Poisons—	—	—	—
Snake-bites	—	—	—
Corrosive Acids	—	—	—
Metallic Poisons	—	—	—
Vegetable Alkaloids	—	—	—
Nature Unknown	—	—	—
Other Poisons	—	—	2
Surgical Operations—	—	—	—
Amputations, Major	—	—	—
„ Minor	—	—	149
Other Operations	—	—	18
Eye	—	—	—
(a) Cataract	—	—	—
(b) Iridectomy	—	—	—
(c) Other Eye Operations	—	—	—

Colonial Medical Reports.—No. 29.—Cyprus—(continued).

THE epidemic was of a fairly mild type, and I saw no case of death from the disease.

There was no case of diphtheria during the year as far as the hospital statistics show, and I saw no case in private practice.

Typhoid fever is responsible for 3 deaths of patients treated in hospital, of which there were 8 cases. I have seen a good number of cases outside the hospital, and I believe the disease was fairly prevalent throughout the whole year. There was no case, however, amongst prisoners. I believe the Nicosia Town water supply to be pure till it reaches the aqueducts for distribution throughout the town, when it becomes liable to contamination. Some of the cases seen by me were no doubt traceable to the use of shallow well waters.

Malarial fevers seem to have been common in the towns and villages, chiefly in the hotter months, from June to October; cases, however, occur throughout the year. Where possible, a microscopical diagnosis is made, but it is impossible to deal with every case in this way, but all cases admitted to hospital are so diagnosed. In this connection an effort was made by me to institute a system of mosquito destruction during the spring and summer, and I was materially assisted by the Municipal Commission of the town of Nicosia. In one instance millions of *Anopheles* larvæ were discovered in the month of August in pools, caused by leakage from the town aqueduct. These were promptly destroyed, and the pools filled in, and the leak in the aqueduct stopped.

I am of opinion that the health of the towns and districts might be improved by the adoption of some system of mosquito prevention and destruction. In other parts of the world such efforts have been attended with success, as in the case of Havanna, Ismalia, and Port Smeltenham, and I believe the matter is worthy of the consideration of this Government.

NICOSIA GENERAL HOSPITAL.

This institution has been of service to the inhabitants of the town and district, and in not a few instances patients have travelled long distances, and even from other districts of the Island in order to get treatment. The number of beds is small and the figures remain much the same as last year. The hospital buildings are badly in need of repair and re-painting, it being some years since this was thoroughly done, and I trust money will be available in the next financial year to carry out this very necessary work. I also beg again to draw attention to the absence of proper accommodation for the treatment of women, and also to the state of the floors of all parts of the building.

The dispensary and out-patients' departments are much in need of re-painting, but in other respects the buildings are in good repair.

In this department 6,359 dressings were applied, and the Nurse of the Colonial Nursing Association (Cyprus Branch) is employed in the out-patient department, when her services are not required outside the hospital. A total of 4,517 patients attended for more than one visit.

TABLE SHOWING TOTAL NUMBER OF IN- AND OUT-PATIENTS TREATED AT THE NICOSIA GENERAL HOSPITAL IN THE YEAR 1905.

	Civilian	Deaths	Police	Deaths	Total	Total Deaths
In-patients ..	287	29	204	0	491	29
Out-patients ..	6,011	0	435	0	6,446	0
					6,937	29

TABLE SHOWING THE ABOVE TOTAL AND THOSE OF PREVIOUS YEARS.

Year	Total In- and Out-patients	Deaths
1900	5,511	31
1901	5,989	22
1902	6,568	25
1903	6,769	20
1904	7,297	22
1905	6,937	29

Report by George A. Williamson, District Medical Officer.

GENERAL REMARKS.

As in former years, the diseases bulking largely are malarial fever, diseases of the digestive and respiratory systems, neuralgia, debility, diseases of the eye, of the cellular tissue, and of the skin.

SEASONAL PREVALENCE.

Purulent conjunctivitis, the seasonal prevalence of which may be given as from the middle of August to the middle of November, was not so frequently met with this summer as usual.

As might be expected, diseases of the respiratory system occurred chiefly during the late autumn, winter and spring.

Influenza appeared in epidemic form during the first quarter of the year, 100 out of the year's total of 117 cases being treated during these three months.

Fibricule was observed during the whole year, but was commoner during the first six months.

Dysentery, of which only 29 cases were treated during the year, occurred chiefly from April to August, 22 of the cases being treated during that period.

Rheumatism was seen chiefly during the early months of the year.

On the other diseases (except malarial fever, to which I refer in the next paragraph) season appeared to have no special influence.

MALARIAL FEVER.

The Malarial Incidence Chart for 1905, which I submit, is of the type I have formerly shown to be characteristic of the disease in Larnaca. The outstanding features are: (1) The presence of cases during January and February; (2) the almost entire

RETURN OF DISEASES AND DEATHS IN 1905 AT THE HOSPITALS, INCLUDING THE LUNATIC ASYLUM
AND LEPER FARM.—Cyprus.

GENERAL DISEASES.				GENERAL DISEASES.—continued.			
	Admis- sions.	Deaths.	Total Cases Treated.		Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism	—	—	—	Other Tubercular Diseases	—	—	—
Anaemia	16	3	17	Varicella	—	—	—
Anthrax	—	—	—	Whooping Cough	—	—	—
Beri-beri	—	—	—	Yaws	—	—	—
Bilharziosis	—	—	—	Yellow Fever.. .. .	—	—	—
Blackwater Fever	—	—	—				
Chicken pox	—	—	—				
Cholera	—	—	—				
Choleraic Diarrhoea	—	—	—				
Congenital Malformation	—	—	—				
Debility	40	7	42				
Delirium Tremens	—	—	—				
Dengue	—	—	—				
Dialates Mellitus	1	—	1				
Dialates Insipidus	—	—	—				
Diphtheria	—	—	5				
Dysentery	30	1	30				
Enteric Fever	29	7	29				
Erysipelas	10	—	10				
Febricula	13	—	13				
Filariasis	—	—	—				
Gonorrhœa	31	—	34				
Gout	—	—	—				
Hydrophobia	—	—	—				
Influenza	80	2	85				
Kala-Azar	—	—	—				
Leprosy	—	—	—				
(a) Nodular	9	5	58				
(b) Anaesthetic	4	4	64				
(c) Mixed	—	—	—				
Malarial Fever—	—	—	—				
(a) Intermittent	—	—	—				
Quotidian	112	—	112				
Tertian	52	—	52				
Quartan	15	1	19				
Irregular	10	1	10				
Type undiagnosed	57	—	57				
(b) Remittent	48	—	49				
(c) Pernicious	21	—	21				
(d) Malarial Cachexia	4	—	4				
Malta Fever	—	—	—				
Measles	4	1	4				
Mumps	1	—	1				
New Growths—	—	—	—				
Non-malignant	8	—	8				
Malignant	15	—	15				
Old Age	—	—	—				
Other Diseases	11	—	12				
Pellagra	—	—	—				
Plague	—	—	—				
Pyæmia	—	—	—				
Rachitis	—	—	—				
Rheumatic Fever	10	—	12				
Rheumatism	34	—	34				
Rheumatoid Arthritis	—	—	—				
Scarlet Fever.. .. .	—	—	—				
Scurvy	—	—	—				
Septicæmia	2	1	3				
Sleeping Sickness	2	—	3				
Sloughing Phagedæna	—	—	—				
Small-pox	—	—	—				
Syphilis	—	—	—				
(a) Primary	9	—	9				
(b) Secondary	8	—	9				
(c) Tertiary	—	—	—				
(d) Congenital	2	—	2				
Tetanus	—	—	—				
Trypanosoma Fever.. .. .	—	—	—				
Tubercle—	15	2	15				
(a) Phthisis Pulmonalis	—	—	—				
(b) Tuberculosis of Glands	—	—	—				
(c) Lupus	—	—	—				
(d) Tabes Mesenterica	—	—	—				
(e) Tuberculous Disease of Bones	—	—	—				

absence during March, April, May, and the first half of June; (3) the large increase in the number of cases in July, August, September, and October; (4) the considerable fall in November with a slight rise in December.

The heavy *late* spring rains of 1905 have had the result that such rains practically invariably have, of causing a severe malarial summer and autumn.

I have been much struck by the large proportion of cases of *æstivo-autumnal* fever and the very few cases of *quartan* fever this year. The former has greatly increased and the latter considerably diminished, while *tertian* fever retains more or less its usual proportion to the total number of cases of malarial fever, or is, perhaps, slightly less than ordinary.

I am quite unable to give any explanation of this distribution of the several types of malaria this year. All that can be said is that *quartan* fever is more typical of a cold malarial country, and *æstivo-autumnal* of a tropical malarial country, while it is probable that *tertian* fever occurs more commonly where there is a warm climate, with, however, a distinct difference in temperature between winter and summer.

During the year I have endeavoured to explain to the patients the method by which malarial fever is carried and the consequent rational means by which infection may be avoided. My object was to try to lessen the incidence, but I can truthfully say that the most intelligent remark made was simply "Just fancy!" and I am sure not one person followed the advice given.

Not only did my attempts at making the natives adopt preventive measures fail, but even in treatment they preferred to be guided by their own ignorance.

I fear that a people who will neither carry out the prophylactic measures explained to them, nor even take the trouble to come for the medicine which is supplied gratis to them, must continue to suffer: my sympathy lies with the poor children whose parents so neglect them, and whose lives are so frequently jeopardised by this criminal carelessness.

Would the people but use (such of them as possess nets) mosquito-nets and carry out the medical instructions as to treatment, the incidence and recurrence of malarial fever would both be remarkably diminished.

It has been asserted that malarial fever and cancer are not found together—an assertion with which my experience does not agree; but I may mention in this connection that only one case of cancer has come to my notice during the year. It is reported on elsewhere.

BACTERIOLOGICAL WORK.

I have, since 1900, done a considerable amount of bacteriological work, having fitted up, at my own expense, a laboratory here. It has been very gratifying to find that such facilities to diagnosis as the bacteriological work gives has been appreciated by several of the medical practitioners. Thus, besides from medical men in Larnaca, I have received specimens for examination from Limassol, Polymedia, and Troödos.

THE PUBLIC HEALTH.

The public health in this district has been, apart from the large amount of malarial fever, good; no cases of diphtheria occurred during the year. Chicken-pox and measles occurred in Larnaca and in several villages, but most of the cases were mild. Enteric fever occurred less frequently than last year, and never reached epidemic form. Conjunctivitis was somewhat less than in 1904.

I have in former reports drawn attention to the absence of means by which the birth rate, marriage rate, and death rate can be calculated. These vital statistics are of very considerable value.

The District Hospital has been taken advantage of, as in former years, by large numbers of the sick poor, and is admitted to be a boon to the town and district.

Report by George J. Harvey, Veterinary Surgeon.

The animals inspected by me for exportation were: sheep, 6,894; lambs, 1,651; goats, 259; oxen, 1,253; pigs, 1,205; donkeys and mules inspected being 6 and 11 respectively.

Lambs were exported principally in March, April, May and June. Pigs all the year, bar June, July and August, and oxen all the year round.

There would have been far larger exportations but for quarantine having to be carried out in Egypt on Cyprus animals, when there were one or two local outbreaks of quarter-ill, anthrax and sheep-pox here. The law at present requires that the infected places, where only one or two animals die, should be gazetted and quarantined before legalised restrictions and penalties can be enforced, preventive measures taken, and the safe destruction of dead bodies enforced.

Thus, in one small place, such quarantine affects the export of the whole island.

A law as to the disposal of the body of any animal dying suddenly or within twenty-four hours from any unknown cause, by burial of the carcase whole, with lime if possible, and with penalties against the owner for not reporting or doing it, would save the villagers thousands of pounds a year.

The diseases prevalent during the past year have been quarter-ill, sheep- and goat-pox, and strangles, anthrax, generally distributed from Papho to the Carpas, and where the blackleg vaccine has been used it has been most successful, and I have heard of no case of death after inoculation this year.

Sheep- and goat-pox have fortunately only appeared in an endemic form, and not generally, and been kept under control.

This I attribute to the instruction given by this office to the villagers in the method of preventive vaccination, which differs from their old method.

Strangles was very prevalent in the spring, and I attribute its spread to the movement of the Zaptiehs' horses. Whether it originated in the villages or towns I cannot say, but nearly all the Zaptiehs' horses were affected, and spread it. It may have been introduced by the imported Syrian horses.

Anthrax has only been reported in a few cases. The Government introduced some 500 double doses of vaccine, which was offered free to the native popu-

lation by advertisement, but only fifteen doses were used.

Report by W. Francis, Government Analyst and Lecturer in Chemistry.

I submit my report on the work done in the Government Analytical and Bacteriological Laboratory during 1905.

During the past year 239 samples were analysed, and 18 bacteriological examinations were made for the Government. One hundred and fifty-eight preparations of a chemical or bacteriological nature were made.

The number of private samples analysed was 23, and in connection with two of which I gave evidence in court.

One hundred and fifty-eight exhibits were received from the police for analyses and examination. For several years past cases of poisoning animals have been reported in the Limassol and Papho districts, but, thanks to the prompt action of the police in seizing all poisons from unauthorised persons, this serious practice has now ceased. At the request of the Chief Commandant of Police, I made, some years ago, a preparation for taking footprints in connection with criminal cases. The preparation was found to

be satisfactory, except that in very warm weather it would not set quickly without the aid of cold water. I am now experimenting with a view of making a composition that will set in the warmest weather without the aid of a cooling agent. The new Food and Drugs Law came into force on January 1st, 1906.

The question of the purity of the water supplies has, as in previous years, occupied my attention. I have analysed forty-eight samples taken from wells in different parts of the Island. Samples of water taken from the source of supply are pure, but are often contaminated by bad earthenware pipes before consumption. For this reason I would suggest that filters be more universally used. Mr. J. A. Wanklyn, the famous water analyst, made many investigations concerning the removal of germs of disease and organic matter from water by filtration through silicated carbon. The result of all his experiments proved conclusively the great benefits that can be derived from the use of good filters. I would strongly suggest that filters be attached to all drinking fountains, and this would greatly improve the public health.

A considerable number of soils have been analysed during the year, both from manured and unmanured land.

The poorer soils are deficient in nitrogenous matter and phosphates.

Colonial Medical Reports.—No. 30.—Seychelles.

MEDICAL REPORT FOR THE YEAR 1905.

By Dr. J. E. ADDISON.

Acting Chief Medical Officer.

VITAL STATISTICS.

The estimated population on December 31st, 1905, was 20,767, being an increase of 349 over the preceding year.

Annexure I. gives the number of persons who arrived at and left Seychelles, and the number of births and deaths during the year.

The birth-rate was 33.30 per thousand, and was lower than that of 1904, which was 34.92 per thousand.

The average birth-rate for the last seven years has been 31.94 per thousand.

The death-rate shows a satisfactory decrease, being 14.98 per thousand against 16.12 in 1904.

The average death-rate for the last seven years has been 17.21 per thousand.

The mortality among infants and young children was higher during this year, the number of children

who died before reaching the age of five years was 126, being an increase of 31 on last year.

The number of juvenile deaths during the last seven years has been as follows:—1899, 121; 1900, 120; 1901, 148; 1902, 122; 1903, 155; 1904, 95; 1905, 126.

The principal causes of the mortality were to be found in intestinal complaints, chiefly due to worms and injudicious feeding, and to the epidemic of whooping-cough which was prevalent during the last two months of the year.

There were fifty-four still births and seven twin births during the year.

METEOROLOGICAL STATISTICS.

Annexure II. shows that the year 1905 was warmer and drier than 1904. The mean temperature was 79.9, against 77.66 for 1904, which was the lowest temperature recorded.

Colonial Medical Reports.—No. 30.—Seychelles (continued).

The total rainfall for the year was only 88.91 inches, against 107.05 inches for 1904. The rainfall was 18.14 inches less than last year.

The rainfall for the last seven years has been as follows:—1899, 88.41; 1900, 111.75; 1901, 102.26; 1902, 87.81; 1903, 132.96; 1904, 107.05; 1905, 88.91.

The average rainfall for the last seven years is 102.73 inches.

The south-east trade wind commenced to blow early in May, and continued until the end of November. It was not so strong and steady as is usually the case.

PREVALENCE OF SICKNESS AT DIFFERENT SEASONS.

The only epidemic disease which prevailed in the Island during the year was whooping-cough, which commenced in the month of November, and continued till the end of the year, this disease not having visited the colony for very many years; the number of cases was large.

The type of the disease was severe, and it is interesting to note that in a precisely similar way to the measles, of which there was an epidemic some three years ago, the complications of the disease did not fall, as is usually the case, on the respiratory, but on the digestive system; a very large number of children were attacked, usually about the third or fourth week of their illness, by a form of enteritis, accompanied by the passage of blood and mucus in the stools, and, as might be expected, the children who harboured a number of worms suffered the most.

Nearly all the fatal cases were due to this complication.

As noted in the report of the Assistant Medical Officer, South Mahé, cases of tuberculosis of the lungs are on the increase; it would appear that the greater number of individuals attacked by this disease belong to the Indian creoles, who come from Mauritius, and I am of opinion that the increase in the number of cases is chiefly due to the fact that the number of this class coming to and residing in Mahé is greater every year, and of course each case that occurs forms a fresh focus of infection; and thus it is to be feared that a disease which a few years ago was quite uncommon will become of greater frequency.

As in the past malarial fever originating in this colony is unknown; the only cases seen are individuals who come to the Island from other countries already infected, these cases invariably do remarkably well.

Without doubt the immunity from this disease is due to the absence of the *Anopheles mosquito*.

Intestinal parasites form the greatest menace to young life, if neglected; the variety of parasite is almost invariably the *Ascaris lumbricoides*, it may be said that scarcely any of the juvenile population are free from this scourge, and the careful mother recognising this, always as a routine administers a vermifuge to her children two or three times a year; in many cases, however, where this precaution is neglected, the child gets his intestinal tract practically full of these parasites; which fact naturally interferes considerably with the proper nourishment of the child;

cases are often seen when the parasites are present in sufficient quantity to give rise to elongated palpable tumours in the child's abdomen, and in several instances I have met with cases of subacute intestinal obstruction due simply to this cause. But, as mentioned when speaking of the whooping cough epidemic, the most danger is caused when the worms act as a complication, or perhaps the cause, of a form of enteritis, which seems to follow the exanthematous diseases.

SANITARY CONDITION OF THE TOWN OF VICTORIA.

The scavenging and night soil service have been performed in a manner distinctly more satisfactory than in former years.

The water supply was abundant all through the year, but owing to the fact that the water is taken directly out of a reservoir without having time to settle and to no system of filtration being used, the water, after heavy rains, is very highly coloured, and contains a very large amount of vegetable matter, which is washed into the rivers by the rains.

Report by J. E. Addison, Acting Chief Medical Officer.

Reports of the Assistant Medical Officers of South Mahé and Praslin districts are submitted herewith. Both reports point out the great improvement in the general health of their districts.

The death-rate of 11.06 for South Mahé is very low, being a decrease of 2.95 per thousand as compared with 1904.

Praslin has a death-rate of 13.77 per thousand, being less than the preceding year, which was 14.08 per thousand.

VACCINATION.

Vaccination this year has given good results, viz. :—

		Victoria		South Mahé
Successful 1st time	...	332	...	138
" 2nd "	...	70	...	17
" 3rd "	...	13	...	—
Unsuccessful	...	28	...	—
		443		155

In August, 1905, compulsory re-vaccination was performed in the town of Victoria, as small-pox was very prevalent in the ports with which Mahé is in communication. Happily, the inhabitants of Seychelles have escaped infection.

QUARANTINE SERVICES.

The quarantine station at Long Island was used during the earlier part of the year.

The station has a steam disinfecter, which is always kept in good condition and ready for use at any moment.

The guardian continues to keep the property under his charge in a very satisfactory condition.

HOSPITALS AND DISPENSARIES.

Annexure III. gives the monthly return of out-patients treated at the public dispensaries and number

of cases treated at the Victoria Hospital during the year 1905.

The number of patients treated at the public dispensaries has been higher than usual, this being entirely due to the prevailing poverty amongst the populace.

This institution received 332 patients for treatment during the year 1905, viz: 258 males and 74 females.

The number of deaths in hospital was 14; being 6 less than during 1904, and giving a death-rate of 42 per cent.

Annexure IV. gives the cases treated at the Victoria Hospital, and cause of death.

Dr. Robert Denman, the Chief Medical Officer, left the Colony on April 9th, 1905, on leave of absence, meanwhile Dr. Ande Gruchy acted as Chief Medical Officer.

ANNEXURE I.

Vital Statistics	Males	Females	Total
Estimated population on Dec. 31st, 1904 ...	10,500	9,918	20,418
Increase by births during 1905 ...	352	328	680
Arrivals during 1905 ...	171	88	259
Decrease by deaths during 1905 ...	168	138	306
Decrease by departures during 1905 ...	217	67	284
Estimated population on Dec. 31st, 1905 ...	10,638	10,129	20,767
Total births during 1905...	352	328	680
Total arrivals during 1905	171	88	259
Total deaths during 1905	168	138	306
Total departures during 1905 ...	217	67	284
Total decrease ...	385	205	590
Total increase as above ..	523	416	939
Total decrease as above ...	385	205	590

Vital Statistics	Males	Females	Total
Real increase ...	138	211	349
Births during 1905 ...	352	328	680
Deaths during 1905 ...	168	138	306
Excess of births over deaths	184	190	374
Departures in 1905 ...	217	67	284
Arrivals in 1905 ...	171	88	259
Excess of departures over arrivals ...	+46	-21	+25
Excess of births over deaths	184	190	374
Excess of departures over deaths ...	+46	-21	+25
Total increase ...	138	211	349
Number of males on Dec. 31st, 1905 ...	10,638		
Number of females on Dec. 31st, 1905 ...		10,129	
Excess of males over females ...	509		
Number of males in 1905	10,638		
Number of males in 1904	10,500		
Increase ...	138		
Number of females in 1905		10,129	
Number of females in 1904		9,918	
Increase		211	

The population has increased by 349; the males by 138, and the females by 211. The increase of females in 1905 exceeded by 73 the increase of males.

AGES AT WHICH DEATH HAS OCCURRED.

Under 1 year	1 to 5 years	5 to 70 years	70 to 100 years	Total
M. F.	M. F.	M. F.	M. F.	M. F.
45 | 40	21 | 20	80 | 64	22 | 14	168 | 138
85	41	144	36	306

Still births, 33 males and 21 females. Total 54. There were 7 twin births during the year.

ANNEXURE II.

RESULT OF CASES TREATED AT THE VICTORIA HOSPITAL.

Sexes	Remaining in Hospital at the end of 1904.	Admitted during 1905.	Total treated	Cured	Relieved	Unrelieved	Died	Remaining at the end of 1905	Total
Males	6	252	258	194	33	11	11	10	258
Females	3	71	74	47	12	9	8	2	74
Total	9	323	332	241	45	20	14	12	332

METEOROLOGICAL RETURN.

Months	Barometer	Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Depth of Humidity	Direction of wind	Average Force	Deaths per month	Remarks
January ..	30.07	161.	72.8	83.1	76.8	6.3	80.	13.40	3.05	N.W.	6.1	41	
February ..	30.07	160.	73.2	83.5	77.0	6.5	80.9	6.03	5.22	N.W.	6.5	27	*S.E. winds from
March ..	30.05	163.	74.2	83.7	79.4	4.3	82.0	3.47	6.50	N.	5.7	23	May 15th, 1905.
April ..	30.07	162.	72.3	86.0	78.6	7.4	79.5	4.22	8.35	N.W.	5.1	32	†.. Instru-
May ..	30.07	160.9	72.6	85.1	78.7	6.4	80.4	9.54	5.75	N.W.	7.2	34	ment broken
June ..	30.10	148.	71.6	82.1	77.0	5.1	79.5	0.89	11.99	*S.E.	11.3	28	—no record.
July ..	30.11	157.	70.2	81.6	76.9	4.7	78.9	0.62	6.17	S.E.	10.6	14	†N.W. from
August ..	30.08	150.2	72.	81.3	76.4	4.9	78.8	6.25	7.39	S.E.	12.3	18	Dec. 3rd, 1905.
September ..	30.08	155.	69.8	82.1	76.1	6.0	79.1	12.92	4.07	S.E.	11.1	16	
October ..	30.07	158.8	70.1	83.4	76.7	6.7	79.9	0.48	5.63	S.E.	8.3	29	
November ..	30.08	† ..	71.6	84.5	77.0	7.5	79.0	5.58	5.29	E. & calm	5.4	15	
December ..	30.03	† ..	71.6	83.	77.3	6.7	80.1	25.51	3.96	†N.W.	7.4	29	

RETURN OF OUT-PATIENTS TREATED AT THE PUBLIC DISPENSARIES.

Month	Victoria Hospital		Anse Royale		Anse Boileau		Praslin		Total
	M.	F.	M.	F.	M.	F.	M.	F.	M. and F.
January ..	53	151	31	11	5	7	49	16	323
February ..	66	199	19	15	3	5	44	8	359
March ..	77	285	23	13	3	5	28	20	454
April ..	63	246	25	15	3	3	24	15	394
May ..	52	217	32	16	3	4	30	21	375
June ..	33	182	30	20	1	10	31	15	322
July ..	36	219	27	17	2	5	24	22	352
August ..	50	172	24	23	2	7	24	18	320
September ..	79	153	25	22	5	6	17	16	323
October ..	53	223	20	18	3	6	17	34	374
November ..	73	213	20	19	1	8	18	17	369
December ..	69	197	21	18	2	5	17	10	339
Total ..	704	2,457	297	207	33	71	323	212	4,304

*Report of First and Second Divisions South Mahé.
By John Thos. Bradley, Assistant Medical Officer,
Anse Royale.*

PART I.

The health of the district continued good until the end of November. At the end of that month whooping-cough entered the district, although no deaths from this disease occurred up to the end of the year, yet I am of opinion that as the disease progresses its virulence will increase, and it will result in the weeding out of weak and debilitated children.

In former reports I drew attention to the fact that tubercular disease was not to be found in South Mahé. It is with regret that I note for the past two years that this cruel disease is making progress. Slowly but surely the insidious approach can be observed, and in future years tuberculosis will have to be reckoned as one of the diseases that active and prompt steps will have to be taken against.

Phthisis is at present occupying world-wide attention; scientific societies all over the world occupy themselves with its causation and treatment. At times it is suddenly reported that a remedy to combat the disease has been discovered, and after a more or less extensive trial the remedy is abandoned, and so year after year we get reports of wonderful remedies, and after a time it is found that the new remedies are no improvement on the old. When a disease is complimented by having so much attention paid to it there is no doubt that its ravages and the death-roll caused by it must be considerable, and I consider that tubercular disease, under all its different forms and manifestations, is one of the greatest scourges of the human race. Taken as a fact that the disease has invaded Seychelles, the people should be educated up to the disease; they should have explained to them what science has done and is doing to stay and arrest its progress, and unless a correct view is brought home to the people the arrest of such an insidious disease is almost impossible.

Diseases of the—				
Cellular Tissue	—	..	—	..
Circulatory System—	—	..	—	..
(a) Valvular Disease of Heart	—	..	—	..
(b) Other Diseases.. .. .	7	..	2	7
Digestive System—	7	..	—	..
(a) Diarrhoea	4	..	—	..
(b) Bill Diarrhoea.. .. .	—	..	—	..
(c) Hepatitis	6	..	—	..
Congestion of the Liver	—	..	—	..
(d) Abscess of Liver	—	..	—	..
(e) Tropical Liver.. .. .	—	..	—	..
(f) Jaundice, Catarrhal	—	..	—	..
(g) Cirrhosis of Liver	—	..	—	..
(h) Acute Yellow Atrophy	—	..	—	..
(i) Sprue	—	..	—	..
(j) Other Diseases	50	..	1	50
Ear	—	..	—	..
Eye	9	..	—	..
Generative System—	35	..	—	..
Male Organs	—	..	—	..
Female Organs	—	..	—	..
Lymphatic System	—	..	—	..
Nervous System	19	..	2	19
Nose	—	..	—	..
Organs of Locomotion.. .. .	—	..	—	..
Respiratory System	16	..	1	16
Skin—	—	..	—	..
(a) Scabies	—	..	—	..
(b) Ringworm	—	..	—	..
(c) Tinea Imbricata	—	..	—	..
(d) Favus	—	..	—	..
(e) Eczema.. .. .	—	..	—	..
(f) Other Diseases	—	..	—	..
Urinary System	5	..	1	5
Injuries, General, Local—	—	..	—	..
(a) Sirois (Heatstroke)	—	..	—	..
(b) Sunstroke (Heat Prostration)	—	..	—	..
(c) Other Injuries	—	..	—	..
Parasites—	—	..	—	..
Ascaris lumbricoides	—	..	—	..
Oxyuris vermicularis	—	..	—	..
Dochmius duodenalis, or Ankylos-	—	..	—	..
toma duodenale	—	..	—	..
Dracunculus medinensis (Guinea-	—	..	—	..
worm)	—	..	—	..
Tape-worm	—	..	—	..
Poisons: -	—	..	—	..
Snake-bites	—	..	—	..
Corrosive Acids	—	..	—	..
Metallic Poisons	—	..	—	..
Vegetable Alkaloids	—	..	—	..
Nature Unknown	—	..	—	..
Other Poisons	—	..	—	..
Surgical Operations—	—	..	—	..
Amputations, Major	—	..	—	..
„ Minor	—	..	—	..
Other Operations	—	..	—	..
Eye	—	..	—	..
(a) Cataract	—	..	—	..
(b) Iridectomy	—	..	—	..
(c) Other Eye Operations	—	..	—	..

Colonial Medical Reports.—No. 30.—Seychelles (continued).

FIFTY years ago the treatment was one of hot and confined rooms, all sources of air being carefully excluded, and the patient was kept like a hot-house plant. To-day the pendulum has gone to the opposite extreme: Fresh air and plenty of it, is the cry, and instead of keeping patients confined to close and stuffy chambers, their treatment is what is called the out-door and sanatorium. This wonderful change in treatment is sanctioned not only on scientific grounds, but on the splendid results now being published of the diminution in the death-rate where open-air treatment is carried out, and these results compared with those obtained under the old *régime*.

The question now at issue is, Can an open-air treatment be carried out with successful results at Seychelles? There are a great many people at Seychelles—in fact, the bulk of the population—who, for lack of means, are unable to take a voyage to South Africa, Algeria, or any of the usual health resorts which are laid down as suitable for individuals suffering from consumption. Under these circumstances the disease has to be combated at home, and I am of opinion that success in the treatment of phthisis can be obtained here, if the disease is taken in time and before it has obtained too firm a grip on the individual.

The question is, what is an ideal climate for tuberculous patients, and how can Seychelles be looked at from this point of view. I hold that the question of climate is less significant than that of *régime*, and it is to the advantage of the great majority of patients to be treated under the normal climatic condition of the individual.

An ideal climate for tuberculous patients is one having a pure and dry air which is frequently in mild movement, a maximum of sunlight, relatively equable temperature and warmth, freedom from dust, a certain amount of shelter, combined with a picturesque landscape and extreme stillness; this would be an ideal climate, in my opinion, but I do not know any country that fills exactly the conditions.

Varieties of climate for tubercular patients may be grouped thus:—

- (1) Sea-coast climates.
- (2) Desert climates.
- (3) Forest and woodland climates of relatively small elevation (say 150 to 1,500 feet).
- (4) Mountain climates (say 1,500 to 10,000 feet or more).

Seychelles is a sea-coast climate, it has the advantages of a pure air, no extreme ranges of temperature; it has the disadvantage of being too humid, and is often relaxing and enervating. I would not recommend an individual to seek Seychelles as a health resort, but I am strongly of opinion that cases of phthisis can be combated with here, as well as in a good many parts of Great Britain and Ireland. The French and Italian Riviera, Madeira, &c., are all sea-coast climates, and are all used as health resorts for consumptive individuals; in late years I understand that the Madeira Islands are not so much used, owing to the depressing and weakening influence on consumptive people. Yet the great question is to cure the patient, and to undertake the cure (other things being

equal) under the conditions which he must meet when recovery has taken place, and this is the issue that has to be faced by the inhabitants of Seychelles.

To sum up, the modern treatment of the disease should be combated in Seychelles on the following lines:—

- (1) Improve the resistance of the individual to the disease.
- (2) Take measures to attack, or at least neutralise, the products resulting from the growth and development of the tubercle bacillus within the body.
- (3) Relieve the more important symptoms and complaints.
- (4) Prevent the progress and advance of the disease in the community.

The improvement under (1) can be carried out on the lines that are followed by the principal sanatoria of the world, viz., fresh air and sunlight, rest, graduated and progressive exercise, dietary, skin hygiene, and medication; (2) and (3) are in the domain of the physician, who should take advantage of the latest discoveries; (4), which is probably the most important, should be met with by educating the public to the disease, by a system of segregation, and the establishment of a sanatorium in which all patients who were attacked by the disease would be compelled to reside.

Referring to pneumonia: during the year five deaths occurred; the mortality rate of this disease increases as you approach the Tropics, and from an examination of statistics of different countries I find that this is borne out.

There is an epidemic of whooping cough amongst the children, and I find that vaccination not only modifies the course of the disease, but in some cases is curative in its effects. I find that children, after vaccination, get a very mild form of the disease, that the spasms are absent, and the vomiting and other disagreeable symptoms do not make their appearance.

The mortality of children under one year is 16; a good number of the children only survive birth an hour or so, and some die within the first week of birth; all the same, more than one-fourth of the deaths that occur can be placed under the first year of life.

PART II.**VITAL STATISTICS.**

As in former years, further on I have attached tables, showing a comparison of the births, deaths, and still-births of the years 1902 to 1905, also comparative tables of the ages at which death occurred during these years.

In my report of last year I tried to show what is the danger zone, &c., in the life of the inhabitants of Seychelles, and also the period more favourable to life. The most favourable period is probably between the ages of 30 and 45, and the dangerous zones the first year of life and after 55.

There is practically no increase in the mortality of children under 5 years, but in the year 1906 I am afraid the epidemic of whooping cough will have a marked increase on the death-rate under 5 years. In 1902 the number of deaths of children under 5 years

was 28, in 1903 it was 21, in 1904 it was 17, and in 1905 it was 20; so that practically for three years the death-rate has not changed.

Taking the births as 166 for the year 1905 and the deaths as 51, the increase in population for the year 1905 is 115; this increase, added to the increases of 1902, 1903, and 1904, makes a net increase of 408 for these four years.

1901 (Census taken in that year), population...	4,203
1902 Estimated population to December 31st	4,301
1903 " " " "	4,404
1904 " " " "	4,496
1905 " " " "	4,611

The number of deaths for the year in South Mahé was 51, a diminution of 12 as compared with the year 1904. I think this is below the average; anyway, it is a small average for the year. As usual, a good number of old people died during the year. There were 7 deaths over 50 and under 60 years; 10 under 80 years; 1 under 90 years, and 1 over 90 years.

Taking the estimated population as 4,611, this works out a death-rate of 11.06 per thousand, being a diminution of 2.95 per thousand as compared with 1904.

The principal diseases that caused death during 1905 as follows: Senile decay, 10; gastritis, 8; pneumonia, 5; hemiplegia, 2; endocarditis, 2; aneurism of aorta, 2; Bright's disease, 2.

During the year 1905 there were only 4 still-births, for the past three years the number was 11 each year.

During the year 1905 there were 166 births, an increase of 11 as compared with 1904.

The average birth-rate per thousand for 1905 is 36.00, being an increase of 1.53 per thousand as compared with the preceding year.

PART III.

DISPENSARIES OF ANSE ROYALE AND ANSE BOILEAU.

The dispensary of Anse Royale was well attended during the year on Mondays, Wednesdays, and Fridays, by the poor. During the year there were 504 consultations, being an increase on the year 1904 of 104 patients.

The dispensary was held at Anse Boileau every Thursday morning. The number of consultations for the year was 104.

As in former years, I have attached tables showing the diseases treated at the dispensaries and the number of consultations under each disease.

VACCINATION.

The vaccine lymph supplied was excellent, and reflects credit on the preparation and maker; even after five and six weeks it still had its vitality. There was a small-pox scare during the year, and an extra supply of vaccine was supplied, some of it came from Madagascar, and the quality from this source was not good—after two weeks it was useless; the extra supply that came afterwards was excellent.

During the year I vaccinated all Government em-

ployees in South Mahé, including the cantoneers; the bulk of the school children attending at Anse Royale were also vaccinated. Of the general public, about 300 adults came to me for the free vaccination. In almost all cases the vaccination was successful, but some of the adults got marked swelling of the arms and glands in the axilla, accompanied by a severe reaction.

During the year I vaccinated 155 children; all the cases were successful; 138 at the first attempt, 17 at the second.

PART IV.

SURGEON'S WORK IN POLICE CASES.

During the year there were 32 police cases at Anse Royale of wounds and blows, and 1 at Anse Boileau. Most of the cases were of a trivial nature, none of them were dangerous to life.

Accompanied by the police I examined and enquired into two deaths in my district, and one just outside the limits of the ninth mile at Anse Boileau. The first of these cases occurred on January 22nd, 1905. Accompanied by Sub-Inspector Tonnet, I went to Grand Police, and after examination of the body I found that death was due to drowning; evidence brought forward showed that it was accidental. The next case occurred on December 25th, 1905, at Anse Boileau; the man in this case had committed suicide in his bath-room. The case outside my district was that of an old man, aged about 80, who, one Sunday afternoon, cut short his life by hanging himself in his bedroom. Hanging is the method preferred by the natives when they wish to commit suicide.

COMPARATIVE TABLE OF BIRTHS, DEATHS AND STILL-BIRTHS DURING THE YEARS 1902, 1903, 1904 AND 1905.

Years	Births	Deaths	Still-births	Remarks
1902	157	59	11	Births in 1903 exceeded that of 1902 by 12; there is a diminution of 14 in the year 1904 compared with 1903; in 1905 the births exceed those of 1904 by 11. The year 1905 is the lowest death-rate in South Mahé for the past four years. The still-births have fallen in 1905 to 4.
1903	169	66	11	
1904	155	63	11	
1905	166	51	4	

BIRTHS, DEATHS, STILL-BIRTHS AND MARRIAGES, 1902 TO 1905.

Years	Births per 1,000	Deaths per 1,000	Still-births per 1,000	Marriages per 1,000	Remarks
1902	36.50	13.71	2.55	5.34	23 marriages in 1902
1903	38.37	14.98	2.49	6.58	29 " " 1903
1904	34.47	14.01	2.44	6.22	28 " " 1904
1905	36.00	11.06	.86	4.51	21 " " 1905

COMPARATIVE TABLES OF THE PRINCIPAL DISEASES CAUSING DEATH IN SOUTH MAHÉ DURING THE YEARS 1902, 1903, 1904
AND 1905.

[illegible]

TABLE OF DISEASES CAUSING DEATH IN SOUTH MAHÉ FIRST AND SECOND DIVISIONS DURING 1905.

Causes of Death	Under 1 year	Under 5 years	Under 20 years	Under 30 years	Under 40 years	Under 50 years	Under 60 years	Under 80 years	Under 90 years	Over 90 years	Total
Abscess of the Liver..	1	..	..	..	1
Anæmia	1	..	..	..	..	..	..	..	..	1
Aneurism of Aorta	1	..	..	1	..	..	2
Bright's Disease	1	..	..	..	1	..	..	..	2
Drowning	1*	..	..	..	..	..	..	..	1
Dysentery	1	..	..	..	..	..	..	..	..	1
Endocarditis	2	..	..	..	2
Gastritis ..	7	1	..	..	..	..	..	..	..	..	8
Hemiplegia	1	1	..	..	2
Influenza	1	..	..	..	1
Phthisis, Pulmonary	1	..	..	..	..	..	..	1
Pneumonia ..	1	..	1	1	2	..	..	..	..	..	5
Syphilis, Hereditary ..	1	..	..	..	..	..	..	..	..	..	1
Syphilis	1	..	..	..	..	..	..	1
Senile Decay	8	1	1	10
Strangulation	1†	..	..	..	..	1
Tetanus	1	..	..	..	..	..	..	1

UNCLASSIFIED CAUSE GIVEN BY RELATIVES.

Disease of the Stomach ..	..	..	..	1	..	..	..	..	..	1
Exhaustion ..	6†	..	..	..	..	..	..	..	..	6
Colic ..	..	1	..	..	..	..	..	..	..	1
Fever ..	..	1	..	..	..	..	..	..	..	1
Infantile Disease ..	1	..	..	..	..	..	..	..	..	1
	16	4	4	5	3	..	7	10	1	51

* A complete enquiry was made ; cause of death accidental.

† Suicide.

† A good number of these children died a few hours after birth.

COMPARATIVE TABLE OF THE AGES AT WHICH DEATH
OCCURRED DURING THE YEARS 1902, 1903,
1904 AND 1905.

Deaths during the year	Under 1 year	Under 5 years	Under 20 years	Under 30 years	Under 40 years	Under 50 years	Under 60 years	Under 80 years	Under 90 years	Over 90 years	Total
1902	16	12	1	9	5	7	4	2	3	—	59
1903	10	11	10	8	4	5	5	9	—	4	66
1904	12	5	4	4	1	4	9	16	3	5	63
1905	16	4	4	5	3	—	7	10	1	1	51

The following were the complaints treated at Anse Royale and Anse Boileau Dispensaries :—

Disease.	Anse Royale. Number of Consultations.	Anse Boileau. Number of Consultations.
Anæmia	41	12
„ Pernicious	4	—
Asthmatic Bronchitis	1	—
Ankylostomiasis	6	—
Amenorrhœa	2	—
Abscess of Knee-joint	10	—
„ Axilla	1	—
Bronchitis, Acute	12	3
„ Chronic	3	1
Bright's Disease	1	—
Constipation	14	3
Colitis	8	—
Colic	8	4
Climacteric	1	—
Conjunctivitis	3	—
Cystitis	3	—
Diarrhœa	4	3
Dysentery	21	3
Dental Abscess	1	—
Dysmenorrhœa	1	2
Debility	65	25

Disease.	Anse Royale. Number of Consultations.	Anse Boileau. Number of Consultations.
Doubtful	—	1
Endocarditis	10	—
Elephantiasis	1	4
Fibroid of Uterus	13	2
Fracture of Arm	—	2
Gastritis	17	4
Glossitis	1	—
Gonorrhœa	24	7
" Warts	1	—
" Bubo	2	—
Goitre	7	—
Hæmorrhoids	11	1
Hernia	11	1
Hysteria	17	2
Hepatitis	3	—
Hydrocele	7	1
Injury to Foot	4	—
Injury to Left Side	1	—
Inflammation of Cord	3	—
Indigestion	9	2
Influenza	1	1
Leprosy	4	4
Lumbago	2	—
Mastitis	2	—
Migraine	3	1
New Growths	11	—
Osteitis	13	—
Otorrhœa	3	—
Ovaritis	4	—
Pregnancy	6	—
Pertussis *	14	—
Phthisis	32	1
Pleurisy	—	1
Rheumatism †	18	2
" Muscular	2	—
Syphilis	17	—
" Hereditary	1	—
" Tertiary	5	1
Synovitis	4	—
Torticollis	—	3
Tonsillitis	4	—
Ulcers, Tropical	4	—
" Syphilitic	2	—
" Varicose	1	—
" of Cornea	4	—
Wounds of Arm	2	—
" Leg	3	—
" Heel	2	—
" Finger	1	—
Worms (<i>Ascaris lumbricoides</i>)	12	8

* Whooping cough declared in the commencement of December.

† A good many of the cases were of a gonorrhœal nature.

PRASLIN DISTRICT.

Medical Report for the Year 1905. By Dr. R. Laidlaw, A.M.O.

THE inhabitants of the Praslin District have again enjoyed, during 1905, a twelvemonth of comparative freedom from sickness and disease, accompanied, as is usual, by a low death-rate and a high birth-rate.

Some particular features of the health of the district and its medical institutions require special notice.

ROUND ISLAND ASYLUM.

In the Leper Home and Pauper Camp, located on Round Island, the population at the beginning of the year was composed of 9 lepers and 10 paupers, and at the end of the year it was composed of 11 lepers and

15 paupers. That is, the diminished income of the labouring class, through lessened employment, has caused an increased demand for Government help in the case of the incapable and the infirm. Throughout the year all the inmates have shown a spirit of contentment and gratitude. Although their daily life is limited and monotonous in its interests, they have not been unhappy, or only when disease was acute. Basket-making, poultry-keeping, and rock-fishing are pursued by several in a fitful fashion, and they are the most cheerful of all. The majority prefer to sit idle in the sun, and do nothing but talk and smoke, and so proclaim practically their belief that idleness is happiness!

DISTRICT DISPENSARIES.

The two dispensaries at St. Anne and Grand Ance, Praslin, and the third at Ladigue have continued free medical help to the more destitute sick. This help, as formerly, has been much appreciated; and now and then, where benefit received was marked, has been very warmly acknowledged.

The number treated during the year has been: 323 new and 212 old cases, as against 243 new and 165 old the year before.

In an appendix the more frequently occurring ailments are enumerated. Of these, the debilitating diseases dependent on or associated with anæmia are the most important, and the most difficult to remedy. More than one generation, in not a few cases, have clearly contributed to the cachectic state and its concomitants. So, prolonged dietetic treatment is indicated as much as ordinary medical treatment.

PARASITIC DISEASES.

The chief parasitic disease is the round-worm, and few young people, if any, are exempt from its attack. Recently, one vermifuge dose administered to a child of six caused the evacuation of above 100 worms! The more formidable tape-worm is rare. We met with one case only in the course of the year.

Tinea of the scalp and skin are not uncommon; they are chiefly found in the case of those who notoriously neglect personal cleanliness. A widespread notion prevails, even amongst the better educated, that a scalp eruption should not be washed. Hence the unsightly heads of many otherwise healthy children.

EPIDEMIC DISEASE.

The district has throughout the year been entirely exempt from epidemic forms of trouble, except influenza colds and sporadic chicken-pox, and the last has been limited in extent, and not dangerous in type.

LEPROSY.

Leprosy is not increasing. An enquiry has been made regarding the possibility of procuring and using in Seychelles the specific remedy associated with the name of Captain Rost, of the I.M.S., which he had termed "leprolin." The announcements of its efficacy, however, seem to have been premature, and it is not as yet available. There is no doubt, however, but that a serum remedy of that special type will ere long be in effective use.

Colonial Medical Reports.—No. 30.—Seychelles (continued).**WOUNDS AND FRACTURES.**

The accidents arising from edged tools still abound, while dislocation and fracture occur occasionally. The gross neglect of surgical instructions, and the attempts to try if something else will not hasten the cure, make one desire a local hospital on a small scale, to control and maintain, for the necessary time, the surgical appliances.

VACCINATION RESULTS.

The vaccine lymph has given good results on the whole, as far as concerns that received from England. The lymph received from Madagascar, in the sudden precautionary measures against a possible invasion of small-pox, did not seem in the district to give results as favourably.

BIRTH AND DEATH-RATES.

The considerable number of 119 births were registered during the year. A large proportion of these are children born out of wedlock. Of the 119 the legitimate were 72 in number, and the illegitimate 47.

Forty-two deaths were registered throughout the year, and of these ten were the deaths of infants under one year, occurring very much, it is to be feared, from maternal ignorance or lack of sufficient care.

The estimated population of the district on January 1st, 1905, was 3,049, and the deaths being 42, gives a death-rate of 13.77 per thousand of the population. The year immediately preceding this figure was slightly higher, viz., 14.08.

APPENDIX.**THE MORE COMMON DISPENSARY DISEASES.**

Abscess.	Anal fissure.
Amenorrhœa.	Anæmia.
Amputation.	Anorexia.

Antrum abscess.	Leucorrhœa.
Asthma.	Locomotor ataxia.
Ascites.	Lumbago.
Blenorrhagia.	Nasal polypus.
Bronchitis.	Necrosis.
Bubo.	Nephritis.
Cardiac palpitation.	Neuralgia.
Cardiac valvular disease.	Ophthalmia neonatorum.
Cataract.	Orchitis.
Cephalalgia.	Otorrhœa.
Cerebritis.	Ovaritis.
Colic.	Paralysis agitans.
Congestio enteri.	Periostitis.
Conjunctivitis.	Perihepatitis.
Coryza.	Perineal abscess.
Constipation.	Polyuria.
Cystitis.	Prostatitis.
Diarrhœa.	Polypus.
Dropsy.	Psoriasis.
Dysentery.	Pulmonary congestion.
Dysmenorrhœa.	Retinitis.
Dyspepsia.	Rheumatism.
Eczema.	Sciatica.
Enteritis.	Spinal meningitis.
Epididymitis.	Sprain.
Epilepsy.	Stomatitis.
Fever.	Syncope.
Fibroids.	Syphilis.
Fracture.	Synovitis.
Hemiplegia.	Tænia favoaca.
Hepatitis.	Tænia tonsurans.
Herpes zoster.	Thrush.
Hæmorrhoids.	Tic douloureux.
Hydrocele.	Tonsillitis.
Hysteria.	Toothache.
Insanity.	Torticollis.
Intracapsular fracture of neck of femur.	Ulcers.
Ichthyosis.	Urticaria.
Influenza.	Varicella.
Kidney rupture.	Warts.
Laryngitis.	Whitlow.
Leprosy.	Worms.
	Wounds.

Colonial Medical Reports.—No. 31.—British Guiana.

MEDICAL REPORT FOR THE YEAR 1905.

By J. E. GODFREY.

Surgeon-General.

RETURN OF THE STATISTICS OF POPULATION FOR THE YEAR 1905.

	Europeans and Whites	Africans	East Indians	Chinese	Mixed	Native Blacks	Aborigines	Total
Number of Inhabitants in 1904 ..	15,698	1,718	125,896	2,538	33,833	115,444	6,801	301,923
„ Births during the year 1905	377	..	4,093	75	1,202	4,069	378	10,194
„ Deaths „ „ „	453	109	3,239	89	679	3,891	354	8,314
„ Immigrants „ „	..	..	2,218	131	..	..	..	2,349
„ Emigrants „ „	..	..	2,561	201	..	..	..	2,762
Number of Inhabitants in 1905 ..	15,622	1,609	126,407	2,449	34,356	116,122	6,825	303,390
Increase .. .. .	..	..	511	..	523	678	24	1,464
Decrease	76	109	..	84	..	..	..	..

POPULATION.

Estimated population (1905), 303,390; births (1905), 10,194; deaths (1905), 8,314; birth-rate per 1,000 (1905), 33.6, (1904) 30.3; death-rate per 1,000 (1905), 27.4, (1904) 28.8.

MORTALITIES.

The relative mortalities in the different quarters were: March quarter, 2,172; June quarter, 1,808; September quarter, 2,161; December quarter, 2,173.

MALARIAL FEVERS.

These showed the highest number of deaths, and were again highest in the September quarter, the June quarter also again showed the lowest number, and the December quarter the next highest number of deaths.

DIARRHOEAL DISEASES.

These showed the next highest number of deaths, the March quarter being responsible for the largest number of cases and the December quarter for the smallest. The June quarter was lower than the September.

BRONCHITIS AND PNEUMONIA.

These diseases were again principally confined to the East Indian race. The totals for the third and last quarters were about the same, and were higher than the first and second quarters, which were about equal.

PHTHISIS AND OTHER FORMS OF TUBERCULOSIS.

These were highest in the December quarter, but there was very little difference between that quarter and the first. The second and third quarters were about the same.

KIDNEY DISEASES.

The deaths from these diseases were highest in the December quarter, the March and September quarters were about the same and were higher than the June quarter.

There were a few sporadic cases of beri-beri, typhoid or enteric and blackwater fevers, but I am again glad to report that the deaths from these diseases were very few.

None of these diseases appeared in an epidemic form.

RETURN OF DISEASES AND DEATHS IN 1905 AT THE FOLLOWING INSTITUTIONS:—

Georgetown Hospital, Berbice Hospital, Suddie Hospitals, Bartica Hospital, Morawhanna Hospitals,
including Arakaka Ward.

GENERAL DISEASES.

	Admis- sions.	Deaths.	Total Cases Treated.
Alcoholism	18	1	18
Anæmia	272	8	272
Anthrax	1	—	1
Beri-beri	1	—	1
Bilharziosis	—	—	—
Blackwater Fever	—	—	—
Chicken-pox	8	—	8
Cholera	—	—	—
Choleraic Diarrhœa	—	—	—
Congenital Malformation	—	—	—
Debility	103	10	103
Delirium Tremens	—	—	—
Dengue	—	—	—
Diabetes Mellitus	4	—	4
Diabetes Insipidus	—	—	—
Diphtheria	—	—	—
Dysentery	294	93	294
Enteric Fever	—	—	—
Erysipelas	14	2	14
Febricula	71	—	71
Filariasis	—	—	—
Gonorrhœa	231	—	231
Gout	—	—	—
Hydrophobia	—	—	—
Influenza	8	—	8
Kala-Azar	—	—	—
Leprosy	—	—	—
(a) Nodular	—	—	—
(b) Anæsthetic	60	1	60
(c) Mixed	24	4	24
Malarial Fever—	52	34	52
(a) Intermittent	1,911	53	1,911
Quotidian	—	—	—
Tertian	—	—	—
Quartan	—	—	—
Irregular	—	—	—
Type undiagnosed	—	—	—
(b) Remittent	87	10	87
(c) Pernicious	27	22	27
(d) Malarial Cachexia	63	1	63
Malta Fever	—	—	—
Measles	52	1	52
Mumps	—	—	—
New Growths—	—	—	—
Non-malignant	37	—	37
Malignant	61	24	61
Old Age	59	13	59
Other Diseases	—	—	—
Pellagra	—	—	—
Plague	—	—	—
Pyæmia	1	—	1
Rachitis	—	—	—
Rheumatic Fever	—	—	—
Rheumatism	338	1	338
Rheumatoid Arthritis	—	—	—
Scarlet Fever	—	—	—
Scurvy	—	—	—
Septicæmia	54	44	54
Sleeping Sickness	—	—	—
Sloughing Phagedæna	—	—	—
Small-pox	—	—	—
Syphilis	—	—	—
(a) Primary	23	—	23
(b) Secondary	221	27	221
(c) Tertiary	—	—	—
(d) Congenital	14	6	14
Tetanus	23	20	23
Trypanosoma Fever	—	—	—
Tubercle—	54	16	54
(a) Phthisis Pulmonalis	—	—	—
(b) Tuberculosis of Glands	—	—	—
(c) Lupus	—	—	—
(d) Tabes Mesenterica	—	—	—
(e) Tuberculous Disease of Bones	—	—	—

GENERAL DISEASES—continued.

	Admis- sions.	Deaths.	Total Cases Treated.
Other Tubercular Diseases	—	—	—
Varicella	—	—	—
Whooping Cough	1	—	1
Yaws	17	—	17
Yellow Fever	—	—	—

LOCAL DISEASES.

Diseases of the—			
Cellular Tissue	639	21	639
Circulatory System—	146	39	146
(a) Valvular Disease of Heart	—	—	—
(b) Other Diseases	—	—	—
Digestive System—	1,458	236	1,458
(a) Diarrhœa	—	—	—
(b) Bill Diarrhœa	—	—	—
(c) Hepatitis	—	—	—
Congestion of the Liver	—	—	—
(d) Abscess of Liver	—	—	—
(e) Tropical Liver	—	—	—
(f) Jaundice, Catarrhal	—	—	—
(g) Cirrhosis of Liver	—	—	—
(h) Acute Yellow Atrophy	—	—	—
(i) Sprue	—	—	—
(j) Other Diseases	—	—	—
Ear	35	—	35
Eye	290	—	290
Generative System—	—	—	—
Male Organs	481	2	481
Female Organs	1,157	44	1,157
Lymphatic System	149	—	149
Nervous System	382	66	382
Nose	9	—	9
Organs of Locomotion	207	1	207
Respiratory System	1,394	455	1,394
Skin—	704	—	704
(a) Scabies	—	—	—
(b) Ringworm	—	—	—
(c) Tinea Imbricata	—	—	—
(d) Favus	—	—	—
(e) Eczema	—	—	—
(f) Other Diseases	—	—	—
Urinary System	602	208	602
Injuries, General, Local—	644	23	644
(a) Siriasis (Heatstroke)	—	—	—
(b) Sunstroke (Heat Prostration)	—	—	—
(c) Other Injuries	—	—	—
Parasites—	473	42	473
Ascaris lumbricoides	—	—	—
Oxyuris vermicularis	—	—	—
Dochmius duodenalis, or Ankylos- toma duodenale	—	—	—
Dracunculus medinensis (Guinea- worm)	—	—	—
Tape-worm	—	—	—
Poisons—	—	—	—
Snake-bites	—	—	—
Corrosive Acids	—	—	—
Metallic Poisons	—	—	—
Vegetable Alkaloids	—	—	—
Nature Unknown	—	—	—
Other Poisons	24	5	24
Surgical Operations—	—	—	—
Amputations, Major	2,484	12	2,484
" Minor	—	—	—
Other Operations	—	—	—
Eye	—	—	—
(a) Cataract	—	—	—
(b) Iridectomy	—	—	—
(c) Other Eye Operations	—	—	—

METEOROLOGICAL RETURN FOR THE YEAR 1905.

				TEMPERATURE						RAINFALL		WIND		Remarks
				Solar Maximum	Minimum on Grass	Shade Maximum	Shade Minimum	Range	Mean	Amount in Inches	Degree of Humidity	General Direction	Average Force	
January..	..	..	..	138.5	72.2	82.1	75.7	6.4	78.9	3.81	74.5	N.E.	2.8	
February	..	..	..	140.0	70.8	82.6	75.5	7.1	79.0	5.34	76.5	"	3.5	
March ..	..	..	..	139.0	71.3	83.6	76.0	7.6	79.8	4.83	77.5	"	3.2	
April ..	..	..	..	135.5	72.3	84.4	77.3	7.1	80.8	4.07	77	"	3.4	
May ..	..	..	..	133.9	71.7	83.6	77.1	6.5	80.4	11.12	82	"	3.3	
June ..	..	..	..	135.5	71.6	83.9	76.5	7.4	80.2	10.58	82	"	2.5	
July ..	..	..	..	139.5	70.6	83.8	76.6	7.2	80.2	7.84	77.5	"	3.3	
August ..	..	..	..	143.4	71.1	85.6	77.2	8.4	81.4	4.25	74	"	3.5	
September	..	..	..	144.1	71.4	86.4	77.9	8.5	82.2	4.31	73	"	3.3	
October ..	..	..	..	144.1	70.6	86.2	77.6	8.6	81.9	2.14	74	"	3.7	
November	..	..	..	140.1	72.8	85.7	78.4	7.3	82.0	3.92	76.5	"	3.3	
December	..	..	..	130.7	72.2	82.9	75.4	7.5	79.1	15.49	82.5	"	2.7	
Total	1,664.3	858.6	1,010.8	921.2	89.6	965.9	77.70	927	..	38.5	
Mean	138.7	71.5	84.2	76.8	7.5	80.5	6.47	77.2	..	3.2	

¹ Taken in the shade.

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[For Contents see page iii.]

[For London School of Tropical Medicine, see p. viii.]

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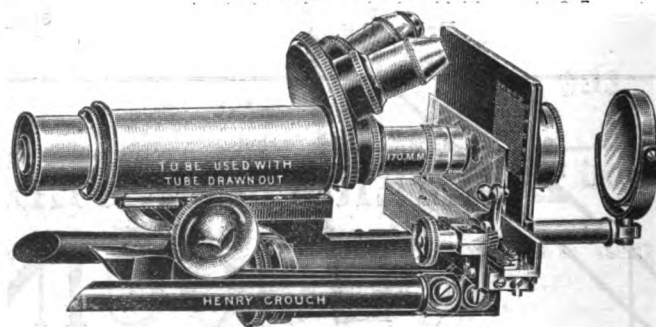
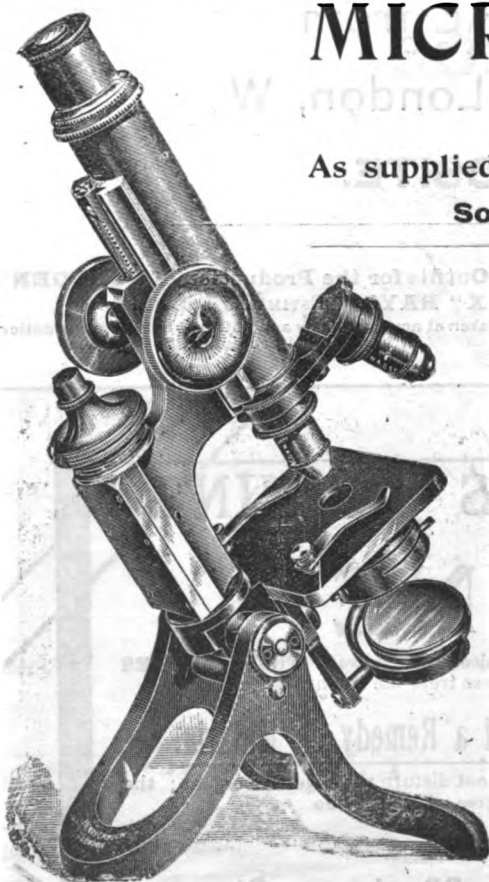
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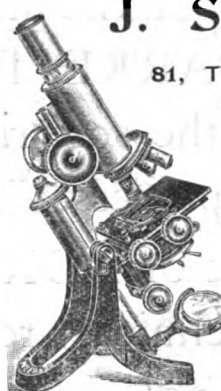
CONTENTS.—DECEMBER 15TH, 1906.

ORIGINAL COMMUNICATIONS.		PAGE
Rodent Ulcer in a Nubian Woman. By ANDREW BALFOUR, M.D., &c.	373	
A Blood-Sucking Hemipteron. By HAROLD H. KING	373	
Dengue in Egypt. By LLEWELLYN PHILLIPS, M.D., B.C., M.A.Cantab., F.R.C.S.Eng., M.R.C.P.Lond.	373	
Vomiting Sickness of Jamaica. By C. W. BRANCH, M.B., C.M.	374	
Business Notices	376	
Reprints	376	
EDITORIAL.		PAGE
The Housing of Europeans on the West Coast of Africa	376	
Liverpool School of Tropical Medicine, Memoir XXI., September, 1906	377	
Abstracts	378	
Review	385	
Personal Notes	386	
Liverpool School of Tropical Medicine	386	
New Instruments	387	
Notes and News	387	
Recent and Current Literature	388	
Notices to Correspondents	388	

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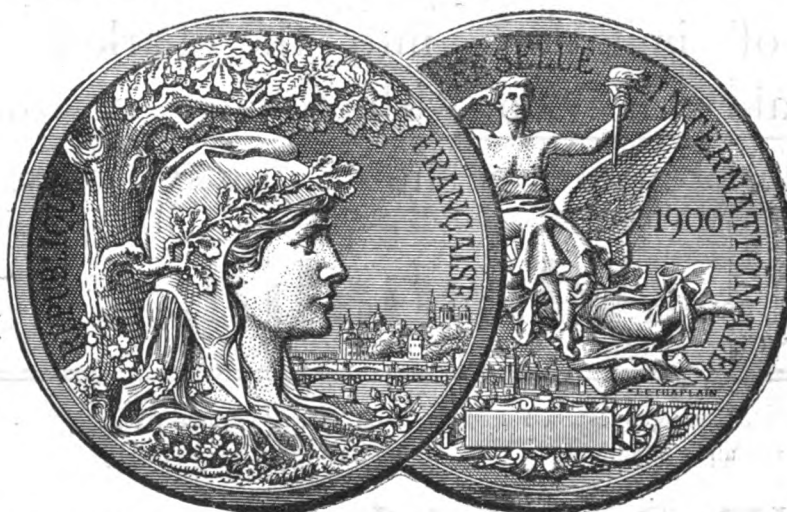
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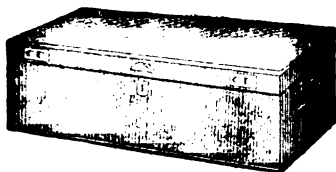
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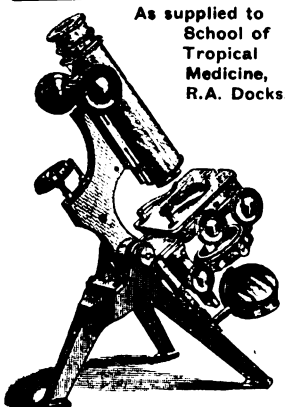


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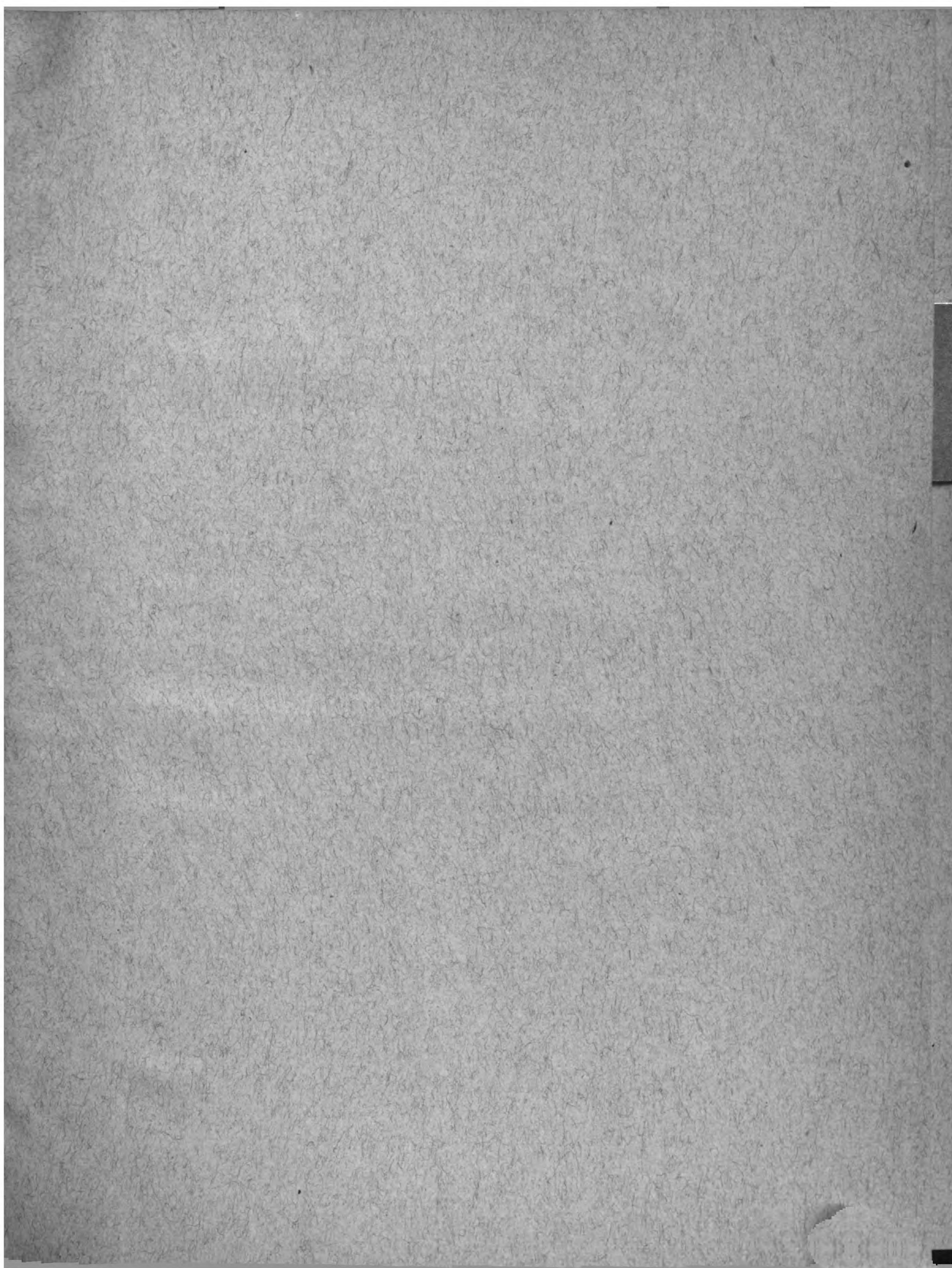
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